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SOME TRANSONIC AND SUPERSONIC DYNAMIC STABILITY CHARACTERISTICS OF A VARIABLE-SWEEP-WING TACTICAL FIGHTER MODEL

by Robert A. Kilgore

Langley Research Center
Hampton, Va. 23365

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16. Abstract

Wind-tunnel tests were made by using a small-amplitude forced-oscillation mechanism to determine the damping and oscillatory stability in pitch and in yaw and the effective-dihedral parameter at angles of attack from about -5° to 17° at Mach numbers from 0.40 to 2.50. The effect of individual model components, tail incidence, and wing-sweep angle was investigated. The data are presented without analysis.

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SOME TRANSONIC AND SUPERSONIC DYNAMIC STABILITY CHARACTERISTICS OF A VARIABLE-SWEEP-WING TACTICAL FIGHTER MODEL

By Robert A. Kilgore
Langley Research Center

SUMMARY

Aerodynamic damping and oscillatory stability in pitch and in yaw and the effective-dihedral parameter were measured for two configurations of a model of a variable-sweep-wing multimission military airplane by using a small-amplitude forced-oscillation mechanism. Tests were made at angles of attack from about -5° to 17° at Mach numbers from 0.40 to 2.50. The effect of individual model components, tail incidence, and wing-sweep angle was investigated. The data are presented without analysis.

INTRODUCTION

Investigations have been conducted by the National Aeronautics and Space Administration to determine the research information necessary to apply the variable-sweep-wing concept to a multimission military airplane. A particular variable-sweep-wing airplane configuration of interest was conceived to operate from land or from aircraft carriers with a minimum of basic configuration modifications. Configuration A was considered to be land based. Configuration B, which was the carrier-based configuration, included such modifications as wing-tip extensions and a shortened fuselage. The static aerodynamic characteristics of both land- and carrier-based configurations have been determined at Mach numbers from 0.50 to 2.86 and are reported in references 1 to 4.

The tests reported herein were made in the Langley 8-foot transonic pressure tunnel and in the Langley Unitary Plan wind tunnel to determine the damping and oscillatory stability in pitch and in yaw and the effective-dihedral parameter at Mach numbers from 0.40 to 2.50. Reynolds number was constant at about 10.6×10^{6} per meter at Mach numbers from 0.40 to 1.20 and varied from 5.3×10^{6} to 6.0×10^{6} per meter at the higher Mach numbers. The angle of attack was varied from about -5° to 17°. The tests were made at an oscillation amplitude of about 1.1° by using a forced-oscillation mechanism. The reduced-frequency parameter was varied from 0.0034 to 0.0250 in pitch and from 0.0181 to 0.1144 in yaw.

A single basic fuselage was fitted with two nose designs and two wing-tip designs to form configurations A and B. Wing-sweep angles of 20°, 50°, and 72.5° were used to provide the proper wing sweep at the various Mach numbers. The horizontal and vertical tails, as well as the wing and the glove, which fairs the wing leading edge into the fuselage, were removed for certain tests in order to determine the aerodynamic contributions of the individual configuration components. The horizontal tail was set at incidence angles of -10° and -20°, in addition to the basic 0° setting, in order to determine the effect of horizontal-tail incidence on the dynamic stability parameters.

The results of this investigation are presented without analysis. All of the data are presented graphically and in tabular form.

SYMBOLS

Measurements and calculations for this investigation were made and are given in the International System of Units (SI). Details concerning the use of SI, together with physical constants and conversion factors, are given in reference 5.

The aerodynamic parameters are referred to the body system of axes, as shown in figure 1, in which the coefficients, angles, and angular velocities are shown in the positive sense. These axes originate at the centers of oscillation of the models, as shown in figure 2. The reference dimensions used herein are based upon a sweepback angle of 16° for the outboard wing panel. The equations which were used to reduce the dimensional aerodynamic parameters of the model to nondimensional aerodynamic parameters are presented in the section entitled, "Measurements and Reduction of Data."

b reference span (wing span): configuration A, 0.8729 meter; configuration B, 0.9699 meter

C_l rolling-moment coefficient, $\frac{\text{Rolling moment}}{q_{\infty}Sb}$ (see fig. 1)

$C_{l_{\dot{r}}} = \frac{\partial C_l}{\partial\left(\frac{\dot{r}b^2}{4V^2}\right)}$ per radian

$C_{l_{\beta}} = \frac{\partial C_l}{\partial \beta}$ per radian

$C_{l_{\beta}} \cos \alpha + k^2 C_{l_{\dot{r}}}$ effective-dihedral parameter, per radian

C_m pitching-moment coefficient, $\frac{\text{Pitching moment}}{q_{\infty}S\bar{c}}$ (see fig. 1)

$C_{m_q} = \frac{\partial C_m}{\partial\left(\frac{q\bar{c}}{2V}\right)}$ per radian

$C_{m_q} + C_{m_{\dot{\alpha}}}$ damping-in-pitch parameter, per radian

$C_{m_{\dot{q}}} = \frac{\partial C_m}{\partial\left(\frac{\dot{q}\bar{c}^2}{4V^2}\right)}$ per radian

$C_{m_\alpha} = \frac{\partial C_m}{\partial \alpha}$ per radian

$C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ oscillatory-longitudinal-stability parameter, per radian

$C_{m_{\dot{\alpha}}} = \frac{\partial C_m}{\partial\left(\frac{\dot{\alpha}\bar{c}}{2V}\right)}$ per radian

C_n yawing-moment coefficient, $\frac{\text{Yawing moment}}{q_\infty Sb}$ (see fig. 1)

$C_{n_r} = \frac{\partial C_n}{\partial\left(\frac{rb}{2V}\right)}$ per radian

$C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$ damping-in-yaw parameter, per radian

$C_{n_{\dot{r}}} = \frac{\partial C_n}{\partial\left(\frac{\dot{r}b^2}{4V^2}\right)}$ per radian

$C_{n_\beta} = \frac{\partial C_n}{\partial \beta}$ per radian

$C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$ oscillatory-directional-stability parameter, per radian

$C_{n_{\dot{\beta}}} = \frac{\partial C_n}{\partial\left(\frac{\dot{\beta}b}{2V}\right)}$ per radian

$\bar{c}$ reference chord (mean aerodynamic chord): configuration A, 0.1253 meter; configuration B, 0.1219 meter

f frequency of oscillation, hertz

i_t horizontal-tail incidence angle, degrees

k	reduced-frequency parameter, $\frac{\omega\bar{c}}{2V}$ in pitch, $\frac{\omega b}{2V}$ in yaw
M	free-stream Mach number
q	angular velocity of model about body Y-axis, rad/sec (see fig. 1)
q_∞	free-stream dynamic pressure, N/m^2
r	angular velocity of model about body Z-axis, rad/sec (see fig. 1)
S	reference area (wing area): configuration A, 0.1009 $meter^2$; configuration B, 0.1055 $meter^2$
V	free-stream velocity, m/sec
X,Y,Z	body system of axes (see fig. 1)
α	angle of attack, degrees or radians; mean angle of attack, degrees (see fig. 1)
β	angle of sideslip, degrees or radians; mean angle of sideslip, degrees (see fig. 1)
Λ	leading-edge sweep angle of outboard wing panel, degrees
ω	angular velocity, $2\pi f$, rad/sec

A dot over a quantity denotes the first derivative with respect to time. The expression $\cos \alpha$ appears in the lateral parameters because these parameters are expressed in the body system of axes.

APPARATUS

Configurations

The two configurations used for this investigation are similar to those used for the static-stability investigations reported in references 1 to 4, except for aft fuselage modifications necessary for sting clearance. The more important design dimensions of the configurations are given in figure 2 with additional details given in table I. As previously mentioned, the land-based configuration is designated herein as configuration A. Configuration B, the carrier-based configuration, has extended wing tips and a shortened fuselage. The configurations have wings at an incidence angle of 1^{o} with respect to the body reference axis and have an inboard sweptback wing-chord extension, or glove, which provides a conventional swept wing when the outer panel is fully swept. In the low-sweep reference position ($\Lambda = 16^{o}$), the wing consisted of an NACA 64A-series airfoil, outboard of the pivot point with 0.20 camber, parallel to the free stream. Twin ventral fins were fitted beneath the fuselage. The basic configurations consist of fuselage, wings, gloves, vertical tail, ventral fins, and horizontal tails at 0^{o} incidence ($i_t = 0^{o}$).

The engine inlets were open and the movable inlet wedge set to provide the proper inlet area for all test Mach numbers. The inlets led to internal ducts which dumped the air into the central sting cavity. The captured air exited around the sting at the base of the fuselage.

The photograph presented as figure 3 shows configuration A mounted on the oscillation-balance mechanism in the test section of the Langley Unitary Plan wind tunnel.

Oscillation-Balance Mechanism

Exploded and assembled views of the forward part of the single-component (pitching moment) oscillation-balance mechanism which was used for this investigation are shown in the photograph presented as figure 4.

Since the amplitude of the forced oscillation is small, the rotary motion of an electric motor is used to provide essentially sinusoidal motion to the balance through the crank and Scotch yoke mechanism. A 1.1^{o} oscillation amplitude was used for all the tests reported herein. The oscillatory motion is about the pivot axis, which is located at the model station corresponding to the proposed center-of-gravity location of the configuration being tested.

The strain-gage bridge used to measure the torque required to oscillate the model is located between the model-mounting surface and the pivot axis. This torque bridge location eliminates the pivot-friction characteristics from the model system and thereby eliminates the need to correct the data for varying pivot friction associated with changing aerodynamic load. Although this bridge is physically forward of the pivot axis, all torques are measured with respect to the pivot axis.

The mechanical spring shown in figure 4 is installed between the model-mounting surface and the fixed sting. The strain-gage bridge, which is attached to the mechanical spring, is used to determine the amplitude of the model angular displacement with respect to the fixed sting. The mechanical spring allows the model system to be oscillated at velocity resonance. Although the configurations may be oscillated at frequencies from about 1 to 30 hertz with the forced-oscillation balance, as mentioned in reference 6, the damping coefficient is obtained most accurately by operating at velocity resonance.

Wind Tunnels

Two wind tunnels were used to obtain the data presented herein. Both tunnels are equipped for control of relative humidity and total temperature of the air in the tunnel in order to minimize the effects of condensation shocks and for control of total pressure in order to obtain the test Reynolds number.

Langley 8-foot transonic pressure tunnel.- The data for Mach numbers from 0.40 to 1.20 were obtained in the Langley 8-foot transonic pressure tunnel. The test section of this single-return closed-circuit wind tunnel is about 2.2 meters square with slotted upper and lower walls to permit continuous operation through the transonic speed range. Test-section Mach numbers from about 0.2 to 1.30 can be obtained and kept constant by controlling the speed of the tunnel-fan drive motor. The Mach number distribution is reasonably uniform throughout the test section, with a maximum deviation from the average free-stream Mach number of approximately 0.01 at the higher Mach numbers.

The sting-support strut is designed to keep the model near the center line of the tunnel through a range of sting angle of attack from about -5° to $+16^{\circ}$ when used with the oscillation-balance mechanism.

Langley Unitary Plan wind tunnel.- The data for Mach numbers of 1.70, 2.16, and 2.50 were obtained in test section number 1 of the Langley Unitary Plan wind tunnel. This single-return tunnel has a test section about 1.2 meters square and about 2.1 meters long. An asymmetric sliding block, which varies the area ratio, is used to change Mach number from about 1.47 to 2.86. The angle-of-attack mechanism used for this investigation has a total range of about 25° when used with the oscillation-balance mechanism. Additional details of the characteristics of the Langley Unitary Plan wind tunnel are given in reference 7.

MEASUREMENTS AND REDUCTION OF DATA

For the pitching tests, measurements are made of the amplitude of the torque required to oscillate the model pitch T_Y, the amplitude of the angular displacement in pitch of the model with respect to the sting Θ, the phase angle η between T_Y and Θ, and the angular velocity of the forced oscillation ω. Some details of the electronic instrumentation used to make these measurements are given in reference 8. The viscous-damping coefficient in pitch C_Y for this single-degree-of-freedom system is computed as

$$C_Y = \frac{T_Y \sin \eta}{\omega\Theta}$$

and the spring-inertia parameter in pitch is computed as

$$K_Y - I_Y\omega^2 = \frac{T_Y \cos \eta}{\Theta}$$

where K_Y is the torsional-spring coefficient of the system and I_Y is the moment of inertia of the system about the body Y-axis.

For these tests, the damping-in-pitch parameter was computed as

$$C_{m_q} + C_{m_{\dot{\alpha}}} = -\frac{2V}{q_\infty S\bar{c}^2}\left[\left(C_Y\right)_{\text{wind on}} - \left(C_Y\right)_{\text{wind off}}\right]$$

and the oscillatory-longitudinal-stability parameter was computed as

$$C_{m_\alpha} - k^2 C_{m_{\dot{q}}} = -\frac{1}{q_\infty S\bar{c}}\left[\left(K_Y - I_Y\omega^2\right)_{\text{wind on}} - \left(K_Y - I_Y\omega^2\right)_{\text{wind off}}\right]$$

Since the wind-off value of C_Y is not a function of oscillation frequency, it is determined at the frequency of wind-off velocity resonance because C_Y can be determined most accurately at this frequency. The wind-off value of $K_Y - I_Y\omega^2$ is determined at the same frequency as the wind-on value of $K_Y - I_Y\omega^2$, since this parameter is a function of frequency.

For the yawing tests, measurements are made of the amplitude of the torque required to oscillate the model in yaw T_Z, the amplitude of the angular displacement in yaw of the model with respect to the sting Ψ, the phase angle λ between T_Z and Ψ, and the angular velocity of the forced oscillation ω. The viscous-damping coefficient in yaw C_Z for this single-degree-of-freedom system is computed as

$$C_Z = \frac{T_Z \sin \lambda}{\omega\Psi}$$

and the spring-inertia parameter in yaw is computed as

$$K_Z - I_Z\omega^2 = \frac{T_Z \cos \lambda}{\Psi}$$

where K_Z is the torsional-spring coefficient of the system and I_Z is the moment of inertia of the system about the body Z-axis.

For these tests, the damping-in-yaw parameter was computed as

$$C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha = - \frac{2V}{q_\infty Sb^2}\left[\left(C_Z\right)_{\text{wind on}} - \left(C_Z\right)_{\text{wind off}}\right]$$

and the oscillatory-directional-stability parameter was computed as

$$C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}} = \frac{1}{q_\infty Sb}\left[\left(K_Z - I_Z\omega^2\right)_{\text{wind on}} - \left(K_Z - I_Z\omega^2\right)_{\text{wind off}}\right]$$

The wind-off value of C_Z is determined at the frequency of wind-off velocity resonance, and the wind-off and wind-on values of $K_Z - I_Z\omega^2$ are determined at the same frequency.

During the yawing-oscillation tests, measurements were made of the amplitude of the rolling torque T_X induced by the yawing oscillation and the phase angle γ between T_X and the yawing displacement Ψ.

That part of the induced rolling torque in phase with yawing displacement was used to compute the following expression for effective-dihedral parameter:

$$C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}} = \frac{1}{q_\infty Sb}\left[\left(\frac{T_X \cos \gamma}{\Psi}\right)_{\text{wind on}} - \left(\frac{T_X \cos \gamma}{\Psi}\right)_{\text{wind off}}\right]$$

The wind-off and wind-on values of $\dfrac{T_X \cos \gamma}{\Psi}$ are determined at the same frequency.

TESTS

The dynamic stability parameters in pitch were measured through a range of angle of attack with the model oscillating in pitch about the body Y-axis. The oscillation balance was rolled 90° within the model to provide oscillations in yaw about the body Z-axis as the model was tested through a range of angle of attack. The tests were made at Mach numbers from 0.40 to 2.50 at an amplitude of about 1.1° by using a small-amplitude forced-oscillation mechanism. Reynolds number was constant at about 10.6×10^6 per meter at Mach numbers from 0.40 to 1.20 and varied from 5.3×10^6 to 6.0×10^6 per meter at the higher Mach numbers. The angle of attack was varied from about -5° to 17°. The reduced-frequency parameter was varied from 0.0034 to 0.0250 in pitch and from 0.0181 to 0.1144 in yaw.

Both configurations were tested with outboard wing panels sweptback at angles of 20°, 50°, and 72.5° about a pivot located outboard of the fuselage. The oscillation centers were located at the model station corresponding to the $0.30\bar{c}$ station ($\Lambda = 16^{\circ}$) for the test with wing sweepback angle of 20°, and at the $0.40\bar{c}$ station ($\Lambda = 16^{\circ}$) for the test with the wing sweepback angles of 50° and 72.5°. Tests were made with horizontal-tail incidence angles of 0°, -10°, and -20°. Some pitching tests were made with the wing, wing glove, and horizontal tail removed in various combinations. The vertical tail and ventral fins were removed for several yawing tests. Some tests were made with the engine inlets plugged and faired over to eliminate internal airflow through the model.

In order to insure a turbulent boundary layer over the model, carborundum grains were applied as three-dimensional roughness to the model nose, to the leading edge of the wing, to the leading edges of the horizontal and vertical tail surfaces, and to the inlets, as shown in figure 5. The roughness size and location were computed by using the method of reference 9.

PRESENTATION OF RESULTS

The data obtained during this investigation are presented graphically in figures 6 to 11. In addition, all of the data are presented in tabular form. The location of the data in the figures and tables is as follows:

Longitudinal Results

Description	Wing sweep angle, Λ, deg	Oscillation-axis location[a]	Horizontal-tail incidence angle, i_t, deg	Mach number, M	Table	Figure
			Configuration A			
Basic	20	$0.30\bar{c}$	0	0.40, 0.60, 0.80	II	6
Basic	50	$.40\bar{c}$	0	0.60, 0.80, 0.90, 1.70, 2.50	II	7
Basic	72.5	$.40\bar{c}$	0	0.80, 1.00, 1.20, 1.70, 2.16, 2.50	II	8
Basic	72.5	$.40\bar{c}$	-20	1.70, 2.50	III	8
Basic	72.5	$.30\bar{c}$	0	1.70, 2.50	IV	8
Glove removed	20	$.30\bar{c}$	0	0.40, 0.60, 0.80	V	6
Wing and glove removed	---	$.30\bar{c}$	0	0.40, 0.60, 0.80	VI	6
Wing, glove, and horizontal tail removed	---	$.30\bar{c}$	---	0.40, 0.60, 0.80	VI	6
Wing and glove removed	---	$.40\bar{c}$	0	0.40, 0.60, 0.80, 1.70, 2.50	VII	7
Wing, glove, and horizontal tail removed	---	$.40\bar{c}$	---	0.40, 0.60, 0.80	VII	7
Horizontal tail removed	20	$.30\bar{c}$	---	0.40, 0.60, 0.80	VIII	6
Horizontal tail removed	50	$.40\bar{c}$	---	0.60, 0.80, 0.90, 1.70, 2.50	VIII	7
Horizontal tail removed	72.5	$.40\bar{c}$	---	0.80, 1.00, 1.20, 1.70, 2.16, 2.50	VIII	8
Engine inlets plugged	20	$.30\bar{c}$	0	0.40, 0.60, 0.80	IX	6
Engine inlets plugged	72.5	$.40\bar{c}$	0	0.80, 1.00, 1.20	IX	8
			Configuration B			
Basic	20	$0.30\bar{c}$	0	0.60	X	6
Basic	72.5	$.40\bar{c}$	0	0.80, 1.20	X	8
Horizontal tail removed	72.5	$.40\bar{c}$	---	2.16	X	8

[a] Based on $\Lambda = 16^{\circ}$.

Lateral Results

Description	Wing-sweep angle, Λ, deg	Oscillation-axis location [a]	Horizontal-tail incidence angle, i_t, deg	Mach number, M	Table	Figure
Configuration A						
Basic	20	$0.30\bar{c}$	0	0.40, 0.60, 0.80	XI	9
Basic	50	$.40\bar{c}$	0	0.60, 0.80, 0.90, 1.70, 2.50	XI	10
Basic	72.5	$.40\bar{c}$	0	0.80, 1.00, 1.20, 1.70, 2.16, 2.50	XI	11
Basic	20	$.30\bar{c}$	-20	0.40, 0.60, 0.80	XII	9
Basic	72.5	$.40\bar{c}$	-20	0.80, 1.00, 1.20, 1.70, 2.16, 2.50	XII	11
Basic	20	$.30\bar{c}$	-10	0.40, 0.60, 0.80	XIII	9
Basic	72.5	$.40\bar{c}$	-10	0.80, 1.00, 1.20, 1.70, 2.16, 2.50	XIII	11
Basic	72.5	$.30\bar{c}$	0	1.70, 2.50	XIV	11
Vertical tail and ventral fins removed	20	$.30\bar{c}$	0	0.40, 0.60, 0.80	XV	9
	50	$.40\bar{c}$	0	0.60, 0.80, 0.90, 1.70, 2.50	XV	10
	72.5	$.40\bar{c}$	0	0.80, 1.00, 1.20, 1.70, 2.16, 2.50	XV	11
Engine inlets plugged	72.5	$.40\bar{c}$	0	1.70, 2.50	XVI	11
Configuration B						
Basic	20	$0.30\bar{c}$	0	0.60	XVII	9
Basic	72.5	$.40\bar{c}$	0	0.80, 1.20	XVII	11
Vertical tail and ventral fins removed	72.5	$.40\bar{c}$	0	2.16	XVIII	11

[a] Based on $\Lambda = 16^{\circ}$.

RÉSUMÉ

Aerodynamic damping and oscillatory stability in pitch and in yaw and the effective-dihedral parameter were measured for two configurations of a model of a variable-sweep-wing multimission military airplane by using a small-amplitude forced-oscillation mechanism. Tests were made at angles of attack from about -5° to 17° at Mach numbers from 0.40 to 2.50. The effect of individual model components, tail incidence, and wing-sweep angle was investigated. The data were presented without analysis.

Langley Research Center,
National Aeronautics and Space Administration,
Hampton, Va., December 18, 1970.

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TABLE I.- GEOMETRIC CHARACTERISTICS OF CONFIGURATIONS

General	Configuration A	Configuration B
Oscillation centers:		
0.30$\bar{c}$, distance from nose of model, meter	0.564	0.489
0.40$\bar{c}$, distance from nose of model, meter	0.577	0.502
Angle-of-attack reference	Body reference line	Body reference line
Fuselage length, meter	0.940	0.865
Wing (based on $\Lambda = 16^{\circ}$)	**Configuration A**	**Configuration B**
Area, S, meter^2	0.1009	0.1055
Span, b, meter	0.8729	0.9699
Mean aerodynamic chord, $\bar{c}$, meter	0.1253	0.1219
Aspect ratio	7.56	8.91
Taper ratio	0.325	0.251
Dihedral angle, deg	0	0
Airfoil section	NACA 64A2XX	NACA 64A2XX
Vertical tail	**Configurations A and B**	
Area, meter^2	0.0235	
Span, meter	0.151	
Tip chord, meter	0.053	
Root chord, meter	0.208	
Taper ratio	0.255	
Aspect ratio	2.32	
Leading-edge sweep angle, deg	55.0	
Trailing-edge sweep angle, deg	22.0	
Airfoil section	Biconvex	
Airfoil thickness/Chord ratio	0.04	
Horizontal tail	**Configurations A and B**	
Area (total), meter^2	0.036	
Span, meter	0.260	
Tip chord, meter	0.038	
Root chord, meter	0.208	
Taper ratio	0.186	
Aspect ratio	1.88	
Leading-edge sweep angle, deg	57.5	
Trailing-edge sweep angle, deg	15.1	
Dihedral angle, deg	0	
Airfoil section	Biconvex	
Airfoil thickness/Chord ratio:		
Root	0.04	
Tip	0.03	

TABLE II.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 20°$; c.g. at $0.30\bar{c}$				
0.40	0.	-27.6	-0.80	.0182
0.40	-1.00	-26.8	-0.89	.0184
0.40	-2.00	-27.6	-0.81	.0182
0.40	0.01	-26.3	-0.81	.0182
0.40	1.00	-26.3	-0.73	.0179
0.40	2.01	-26.5	-0.69	.0178
0.40	4.00	-28.2	-0.89	.0185
0.40	6.00	-29.2	-0.95	.0186
0.40	8.01	-31.5	-0.90	.0185
0.40	9.99	-30.8	-0.73	.0180
0.40	12.01	-28.4	-0.69	.0178
0.40	14.00	-21.5	-0.76	.0180
0.40	16.00	-26.0	-2.24	.0223
0.40	0.	-28.0	-0.80	.0182
0.60	0.01	-29.8	-0.78	.0130
0.60	1.02	-28.6	-0.66	.0126
0.60	2.03	-30.0	-0.64	.0126
0.60	3.99	-31.4	-0.72	.0128
0.60	6.02	-36.9	-0.60	.0124
0.60	8.02	-34.3	-0.92	.0134
0.60	10.01	-30.0	-1.07	.0138
0.60	12.01	-26.1	-1.31	.0145
0.60	14.01	-24.3	-1.80	.0158
0.60	16.02	-26.7	-2.74	.0179
0.60	-1.01	-28.1	-0.87	.0133
0.60	-1.99	-29.6	-0.82	.0131
0.60	0.	-28.1	-0.79	.0130
0.80	0.	-37.5	-0.46	.0095
0.80	-2.00	-36.9	-0.69	.0102
0.80	-1.00	-34.9	-0.75	.0103
0.80	-0.01	-39.0	-0.48	.0096
0.80	1.00	-39.6	-0.06	.0082
0.80	2.00	-40.5	0.09	.0076
0.80	3.99	-35.5	-0.53	.0097
0.80	5.99	-30.4	-1.43	.0121
0.80	8.00	-14.0	-2.04	.0134
0.80	10.00	-29.9	-1.72	.0127
0.80	12.00	-38.7	-2.75	.0149
0.80	-0.01	-37.1	-0.50	.0096
$\Lambda = 50°$; c.g. at $0.40\bar{c}$				
0.60	-0.01	-35.6	-2.06	.0161
0.60	-2.00	-35.1	-2.07	.0161
0.60	-0.98	-36.0	-2.10	.0162
0.60	1.00	-35.6	-2.00	.0160
0.60	1.99	-35.7	-1.94	.0159
0.60	3.99	-40.7	-1.70	.0154
0.60	6.01	-40.1	-2.34	.0166
0.60	8.00	-51.4	-1.52	.0150
0.60	10.01	-45.9	-1.47	.0149
0.60	12.02	-42.2	-1.42	.0148
0.60	0.	-35.6	-2.07	.0161
$\Lambda = 50°$; c.g. at $0.40\bar{c}$				
0.80	-0.01	-38.2	-2.21	.0133
0.80	-1.98	-40.4	-2.21	.0133
0.80	-1.01	-40.0	-2.24	.0134
0.80	0.99	-38.9	-2.15	.0132
0.80	1.99	-39.6	-2.08	.0131
0.80	3.99	-44.7	-1.92	.0128
0.80	6.00	-55.5	-2.08	.0131
0.80	8.01	-64.5	-0.82	.0108
0.80	10.01	-44.3	-1.67	.0124
0.80	12.00	-51.3	-1.29	.0117
0.80	-0.01	-39.4	-2.18	.0133
0.90	0.01	-43.8	-2.34	.0125
0.90	-2.00	-46.2	-2.30	.0124
0.90	-0.99	-49.1	-2.41	.0126
0.90	1.01	-44.1	-2.40	.0126
0.90	2.00	-45.7	-2.56	.0128
0.90	4.00	-52.1	-2.25	.0123
0.90	6.00	-73.5	-1.59	.0113
0.90	8.01	-102.1	0.02	.0080
0.90	9.99	-53.0	-2.54	.0128
0.90	12.02	-38.0	-3.24	.0138
0.90	-0.01	-45.3	-2.36	.0125
1.70	0.48	-22.5	-2.67	.0063
1.70	1.48	-24.6	-2.72	.0063
1.70	2.48	-18.3	-2.76	.0063
1.70	4.52	-30.7	-2.82	.0064
1.70	6.56	-31.3	-2.77	.0064
1.70	8.49	-31.5	-2.86	.0064
1.70	10.46	-42.6	-3.03	.0065
1.70	0.47	-23.9	-2.71	.0063
2.50	1.04	-13.3	-1.92	.0046
2.50	-2.90	-17.6	-1.66	.0044
2.50	-0.93	-18.5	-1.85	.0045
2.50	0.11	-13.2	-1.94	.0046
2.50	1.06	-22.1	-1.94	.0046
2.50	2.08	-20.3	-1.88	.0046
2.50	3.10	-21.2	-1.88	.0046
2.50	5.14	-28.4	-1.95	.0046
2.50	7.11	-24.6	-1.92	.0046
2.50	9.06	-25.1	-1.94	.0046
2.50	11.11	-25.7	-2.01	.0047
2.50	1.10	-16.1	-1.95	.0046

TABLE II.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A – Concluded

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 72.5°$; c.g. at 40$\bar{c}$				
0.80	0.	-31.3	-0.65	.0104
0.80	-2.00	-31.3	-0.72	.0106
0.80	-1.00	-30.0	-0.60	.0103
0.80	-0.01	-30.1	-0.66	.0104
0.80	1.00	-32.9	-0.76	.0106
0.80	1.99	-31.7	-0.93	.0110
0.80	4.00	-31.2	-1.74	.0125
0.80	6.00	-32.1	-1.96	.0129
0.80	8.00	-28.4	-2.83	.0143
0.80	10.00	-36.9	-2.20	.0133
0.80	12.00	-36.8	-2.33	.0135
1.00	0.	-35.8	-0.90	.0092
1.00	-2.00	-37.2	-1.17	.0097
1.00	-1.00	-35.8	-0.91	.0092
1.00	-0.01	-36.2	-0.91	.0092
1.00	1.00	-34.8	-1.01	.0094
1.00	2.00	-34.9	-1.32	.0099
1.00	3.99	-30.8	-2.35	.0116
1.00	5.99	-26.3	-2.90	.0124
1.00	8.00	-18.2	-4.14	.0140
1.00	10.00	-11.0	-3.97	.0138
1.00	12.00	-22.9	-3.51	.0132
1.20	0.	-35.0	-1.90	.0096
1.20	-2.00	-35.2	-2.00	.0098
1.20	-1.00	-33.7	-1.89	.0096
1.20	0.	-34.1	-1.89	.0096
1.20	1.00	-33.6	-2.04	.0098
1.20	2.00	-35.8	-2.30	.0102
1.20	4.00	-33.3	-2.96	.0111
1.20	6.00	-30.2	-3.64	.0119
1.20	8.00	-26.8	-4.02	.0123
1.20	10.00	-31.5	-3.78	.0120
1.20	12.00	-30.5	-3.85	.0121

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 72.5°$; c.g. at 0.40$\bar{c}$				
1.70	0.48	-30.5	-1.98	.0056
1.70	-0.51	-31.3	-1.87	.0055
1.70	1.48	-31.2	-2.17	.0057
1.70	2.47	-27.7	-2.42	.0059
1.70	4.47	-32.1	-2.98	.0063
1.70	6.47	-29.7	-3.20	.0065
1.70	8.46	-30.6	-3.13	.0065
1.70	10.46	-24.1	-3.09	.0064
1.70	6.47	-34.6	-3.16	.0065
1.70	0.48	-27.8	-1.98	.0056
2.16	1.42	-20.6	-2.10	.0049
2.16	0.43	-22.8	-1.83	.0047
2.16	-0.56	-24.8	-1.68	.0046
2.16	-2.56	-25.0	-1.77	.0047
2.16	-4.58	-33.7	-1.97	.0049
2.16	2.41	-24.1	-2.16	.0050
2.16	3.44	-25.1	-2.14	.0050
2.16	5.42	-23.2	-2.28	.0051
2.16	7.43	-32.6	-2.28	.0051
2.16	9.45	-34.2	-2.24	.0050
2.16	11.45	-38.5	-2.08	.0049
2.16	1.45	-21.4	-2.11	.0049
2.50	1.07	-27.1	-1.76	.0044
2.50	0.10	-23.6	-1.66	.0043
2.50	-0.91	-22.0	-1.69	.0043
2.50	-2.94	-22.4	-1.79	.0044
2.50	-4.93	-45.0	-1.73	.0044
2.50	2.09	-28.1	-1.89	.0045
2.50	3.10	-15.7	-1.95	.0045
2.50	5.06	-25.4	-1.99	.0045
2.50	5.79	-23.2	-1.98	.0045
2.50	9.06	-41.8	-2.02	.0045
2.50	11.11	-20.7	-1.81	.0044
2.50	1.06	-29.2	-1.78	.0044

TABLE III.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH $i_t = -20^{\circ}$

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 72.5^{\circ}$; c.g. at $0.40\bar{c}$				
1.70	4.49	-15.0	-3.68	.0067
1.70	6.43	-11.8	-4.28	.0071
1.70	8.51	-18.9	-3.53	.0066
1.70	10.45	-22.1	-3.03	.0063
1.70	12.48	-19.7	-3.31	.0065
1.70	14.49	-26.7	-2.59	.0060
1.70	16.49	-29.0	-2.41	.0058
1.70	4.49	-17.9	-3.52	.0066
2.50	5.16	-14.9	-2.51	.0048
2.50	7.05	-6.2	-2.40	.0047
2.50	9.10	-13.3	-2.25	.0046
2.50	11.11	-19.4	-2.09	.0046
2.50	13.06	-22.1	-1.19	.0039
2.50	15.11	-30.1	-1.15	.0039
2.50	17.06	-29.1	-1.22	.0039
2.50	12.08	-22.9	-1.55	.0042
2.50	5.12	-2.2	-2.47	.0048

TABLE IV.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH OSCILLATION AXIS AT $0.30\bar{c}$

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 72.5^{\circ}$				
1.70	0.45	-28.9	-2.27	.0057
1.70	-0.52	-34.4	-2.15	.0056
1.70	1.50	-34.6	-2.52	.0059
1.70	2.46	-23.7	-2.77	.0061
1.70	4.48	-28.8	-3.32	.0065
1.70	6.48	-26.4	-3.58	.0067
1.70	8.50	-41.6	-3.44	.0066
1.70	10.49	-33.3	-3.41	.0066
1.70	0.47	-36.9	-2.24	.0057
2.50	1.05	-18.0	-2.12	.0046
2.50	-2.91	-24.6	-2.09	.0045
2.50	-0.91	-15.4	-1.94	.0044
2.50	0.09	-14.8	-1.99	.0045
2.50	1.07	-18.0	-2.11	.0046
2.50	2.08	-26.7	-2.19	.0046
2.50	3.09	-19.1	-2.25	.0046
2.50	5.08	-25.0	-2.25	.0046
2.50	7.10	-9.2	-2.30	.0047
2.50	9.08	-31.9	-2.15	.0046
2.50	11.11	-33.6	-2.02	.0045
2.50	1.08	-23.9	-2.11	.0046

TABLE V.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH GLOVE REMOVED

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 20°$; c.g. at $0.30\bar{c}$				
0.40	0.01	-30.7	-1.04	.0203
0.40	-1.99	-32.6	-1.08	.0204
0.40	-1.01	-32.3	-1.05	.0203
0.40	1.01	-30.8	-0.92	.0200
0.40	2.00	-30.9	-0.94	.0200
0.40	4.00	-32.8	-1.19	.0206
0.40	6.00	-33.5	-1.42	.0211
0.40	8.01	-37.6	-1.66	.0217
0.40	10.00	-22.0	-2.40	.0233
0.40	12.00	2.0	-3.24	.0250
0.40	14.00	1.9	-2.58	.0237
0.40	16.00	-30.0	-1.98	.0224
0.60	0.	-34.6	-1.00	.0144
0.60	-1.99	-36.9	-1.04	.0145
0.60	-1.00	-34.8	-1.04	.0145
0.60	1.00	-33.9	-0.91	.0142
0.60	2.00	-33.1	-0.92	.0142
0.60	4.00	-36.2	-1.05	.0145
0.60	6.00	-40.4	-1.22	.0148
0.60	8.01	-36.0	-1.56	.0156
0.60	10.01	-0.2	-3.31	.0188
0.60	12.00	-6.6	-3.04	.0184
0.60	14.01	-22.8	-2.23	.0170
0.60	16.00	-36.1	-2.02	.0165
0.80	0.	-45.6	-0.65	.0107
0.80	-1.98	-46.3	-0.88	.0112
0.80	-1.01	-43.6	-0.90	.0113
0.80	1.00	-47.5	-0.25	.0098
0.80	1.99	-47.6	-0.17	.0096
0.80	3.99	-35.1	-1.23	.0119
0.80	6.00	-23.2	-2.49	.0142
0.80	8.01	-38.0	-2.62	.0144
0.80	10.00	-20.5	-2.90	.0149
0.80	12.00	-42.9	-3.01	.0151
0.80	14.00	-44.7	-2.38	.0141
0.80	16.00	-58.1	-2.30	.0139

TABLE VI.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH WING AND GLOVE REMOVED AND OSCILLATION AXIS AT 0.30$\bar{c}$

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
Horizontal tail on				
0.40	-0.01	-22.7	-2.06	.0227
0.40	-2.01	-23.7	-2.19	.0230
0.40	-1.02	-24.4	-2.10	.0228
0.40	1.01	-23.8	-2.16	.0229
0.40	2.00	-24.8	-2.35	.0233
0.40	4.00	-26.9	-2.61	.0238
0.40	6.00	-27.4	-2.81	.0242
0.40	8.00	-27.3	-2.50	.0236
0.40	10.00	-21.8	-2.50	.0236
0.40	12.00	-20.1	-2.81	.0242
0.40	14.00	-22.0	-2.58	.0238
0.40	16.00	-28.6	-2.21	.0230
0.60	0.	-23.7	-2.12	.0168
0.60	-1.99	-23.9	-2.30	.0171
0.60	-0.99	-22.9	-2.11	.0168
0.60	-0.01	-24.5	-2.12	.0168
0.60	1.01	-23.0	-2.25	.0170
0.60	1.98	-24.4	-2.49	.0175
0.60	4.01	-27.7	-2.69	.0178
0.60	6.01	-28.0	-2.96	.0183
0.60	8.01	-25.2	-2.87	.0181
0.60	9.99	-28.4	-2.83	.0181
0.60	11.99	-30.1	-2.54	.0175
0.60	14.02	-30.7	-2.38	.0173
0.60	15.99	-30.8	-2.20	.0169
0.80	-0.01	-22.2	-2.26	.0139
0.80	-2.00	-24.4	-2.47	.0142
0.80	-0.98	-23.0	-2.26	.0139
0.80	0.98	-24.3	-2.38	.0141
0.80	2.01	-25.9	-2.58	.0144
0.80	4.01	-24.0	-3.09	.0152
0.80	6.01	-29.0	-3.03	.0151
0.80	8.02	-31.3	-3.10	.0152
0.80	10.00	-31.7	-2.99	.0151
0.80	11.99	-34.5	-2.46	.0142
0.80	13.98	-34.7	-2.36	.0141
0.80	15.99	-30.6	-2.30	.0140

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
Horizontal tail off				
0.40	-0.01	-8.5	0.44	.0177
0.40	-2.01	-8.8	0.44	.0178
0.40	-1.02	-9.3	0.51	.0175
0.40	0.	-8.9	0.47	.0177
0.40	1.00	-9.9	0.45	.0177
0.40	2.02	-9.6	0.49	.0176
0.40	4.00	-8.6	0.45	.0177
0.40	6.01	-8.7	0.40	.0179
0.40	8.01	-8.8	0.27	.0183
0.40	10.00	-8.1	0.20	.0185
0.40	11.97	-7.9	0.12	.0187
0.40	14.01	-8.5	0.07	.0189
0.40	16.00	-8.2	0.07	.0189
0.60	0.	-9.4	0.50	.0114
0.60	-2.02	-9.5	0.51	.0114
0.60	-1.00	-8.1	0.51	.0114
0.60	-0.01	-9.2	0.52	.0114
0.60	0.99	-9.6	0.46	.0116
0.60	1.99	-8.0	0.45	.0116
0.60	4.02	-8.0	0.46	.0116
0.60	6.01	-9.3	0.42	.0117
0.60	7.99	-8.1	0.29	.0121
0.60	10.00	-8.0	0.22	.0123
0.60	11.97	-8.4	0.16	.0125
0.60	14.01	-8.6	0.14	.0125
0.60	15.97	-8.2	0.11	.0126
0.80	0.	-9.0	0.61	.0081
0.80	-2.02	-8.9	0.59	.0082
0.80	-1.00	-7.9	0.62	.0081
0.80	-0.01	-9.4	0.61	.0081
0.80	1.01	-9.4	0.59	.0082
0.80	2.02	-9.1	0.53	.0084
0.80	3.99	-7.1	0.49	.0085
0.80	6.00	-8.4	0.53	.0084
0.80	8.02	-8.5	0.42	.0087
0.80	9.99	-7.6	0.31	.0090
0.80	12.00	-9.6	0.23	.0093
0.80	14.01	-8.4	0.12	.0096
0.80	16.01	-7.1	0.03	.0098

TABLE VII. - DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH WING AND GLOVE REMOVED AND OSCILLATION AXIS AT 0.40$\bar{c}$

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
Horizontal tail on				
0.40	0.	-24.4	-2.18	.0229
0.40	-2.00	-26.8	-2.33	.0232
0.40	-1.01	-25.4	-2.19	.0229
0.40	0.01	-25.3	-2.20	.0229
0.40	1.01	-24.8	-2.34	.0232
0.40	2.01	-26.2	-2.57	.0236
0.40	4.02	-28.9	-2.80	.0241
0.40	6.01	-30.1	-2.97	.0244
0.40	8.01	-30.9	-2.66	.0238
0.40	10.02	-24.2	-2.68	.0239
0.40	12.01	-19.3	-3.00	.0245
0.40	13.99	-23.0	-2.83	.0242
0.40	16.00	-31.3	-2.45	.0234
0.60	0.01	-25.5	-2.24	.0169
0.60	-2.00	-27.6	-2.53	.0173
0.60	-1.01	-27.5	-2.32	.0170
0.60	-0.01	-25.1	-2.29	.0170
0.60	0.98	-26.4	-2.41	.0172
0.60	2.01	-26.6	-2.68	.0177
0.60	4.01	-31.6	-2.91	.0181
0.60	6.00	-30.0	-3.20	.0186
0.60	8.00	-32.7	-3.01	.0183
0.60	10.00	-28.0	-3.22	.0186
0.60	12.00	-32.1	-2.86	.0180
0.60	14.02	-35.6	-2.70	.0177
0.60	15.98	-35.7	-2.42	.0172
0.80	0.	-26.9	-2.43	.0141
0.80	-2.01	-26.4	-2.68	.0145
0.80	-1.00	-26.8	-2.46	.0142
0.80	0.01	-26.4	-2.42	.0141
0.80	0.99	-27.5	-2.54	.0143
0.80	2.00	-28.1	-2.78	.0147
0.80	3.99	-28.7	-3.29	.0154
0.80	6.00	-32.0	-3.24	.0153
0.80	8.00	-34.3	-3.36	.0156
0.80	10.00	-36.0	-3.26	.0154
0.80	11.99	-39.8	-2.69	.0145
0.80	14.00	-37.8	-2.64	.0144
0.80	16.00	-36.2	-2.81	.0147
1.70	0.45	-26.4	-2.08	.0059
1.70	-0.53	-23.8	-1.96	.0058
1.70	0.45	-23.7	-2.12	.0059
1.70	1.46	-30.4	-2.29	.0061
1.70	2.50	-19.9	-2.34	.0061
1.70	4.50	-21.5	-2.33	.0061
1.70	6.45	-22.5	-2.26	.0060
1.70	8.47	-21.8	-2.11	.0059
1.70	10.49	-29.3	-2.02	.0058
1.70	12.47	-30.0	-2.05	.0059
1.70	14.47	-38.4	-1.95	.0058
1.70	16.44	-28.8	-1.88	.0057
1.70	0.48	-27.0	-2.13	.0059
Horizontal tail on				
2.50	1.05	-14.8	-1.36	.0043
2.50	0.07	-12.3	-1.30	.0042
2.50	-0.89	-19.7	-1.38	.0043
2.50	-2.91	-19.7	-1.36	.0043
2.50	-3.94	-18.8	-1.30	.0042
2.50	1.11	-14.1	-1.44	.0043
2.50	2.06	-25.9	-1.44	.0043
2.50	3.08	-17.3	-1.46	.0043
2.50	5.10	-16.7	-1.46	.0043
2.50	7.11	-27.7	-1.30	.0042
2.50	9.07	-24.1	-1.35	.0042
2.50	11.13	-28.6	-1.21	.0041
2.50	13.07	-25.6	-1.16	.0041
2.50	15.09	-29.6	-1.15	.0041
2.50	17.10	-35.4	-1.12	.0041
2.50	1.07	-10.4	-1.40	.0043
Horizontal tail off				
0.40	0.	-9.2	0.50	.0176
0.40	-1.98	-8.7	0.41	.0179
0.40	-0.99	-9.3	0.44	.0178
0.40	0.98	-8.8	0.44	.0178
0.40	1.99	-7.8	0.44	.0178
0.40	4.00	-8.1	0.45	.0178
0.40	6.00	-7.7	0.39	.0179
0.40	8.01	-8.3	0.30	.0182
0.40	10.01	-7.7	0.20	.0185
0.40	12.01	-7.4	0.15	.0187
0.40	14.00	-5.8	0.08	.0189
0.40	16.01	-7.5	0.08	.0189
0.60	0.	-8.8	0.52	.0114
0.60	-1.99	-9.7	0.47	.0115
0.60	-1.02	-9.0	0.51	.0114
0.60	1.00	-8.1	0.46	.0116
0.60	2.00	-8.4	0.46	.0116
0.60	4.01	-8.4	0.48	.0115
0.60	6.01	-8.0	0.42	.0117
0.60	8.01	-6.9	0.27	.0122
0.60	10.01	-7.8	0.22	.0123
0.60	12.02	-6.9	0.16	.0125
0.60	14.00	-7.6	0.13	.0126
0.60	16.01	-7.3	0.09	.0127
0.80	0.01	-9.4	0.57	.0082
0.80	-1.99	-7.8	0.55	.0083
0.80	-1.08	-9.5	0.60	.0081
0.80	1.01	-8.1	0.56	.0083
0.80	2.00	-8.9	0.52	.0084
0.80	4.00	-7.8	0.47	.0086
0.80	6.00	-8.3	0.52	.0084
0.80	8.01	-7.7	0.41	.0088
0.80	10.01	-7.6	0.30	.0091
0.80	12.01	-7.7	0.23	.0093
0.80	13.97	-6.9	0.10	.0097
0.80	16.01	-7.0	0.05	.0099

TABLE VIII.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH HORIZONTAL TAIL REMOVED

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 20^\circ$; c.g. at $0.30\bar{c}$				
0.40	0.	-8.6	0.40	.0148
0.40	-1.00	-7.2	0.37	.0150
0.40	-2.00	-7.4	0.43	.0147
0.40	0.	-8.2	0.40	.0148
0.40	1.00	-8.5	0.41	.0148
0.40	2.00	-6.5	0.38	.0149
0.40	4.00	-5.9	0.45	.0146
0.40	6.00	-7.4	0.57	.0140
0.40	8.00	-10.8	0.80	.0127
0.40	9.99	-10.6	0.71	.0132
0.40	12.00	-10.3	0.82	.0126
0.40	14.00	-6.6	1.35	.0088
0.40	16.00	-19.9	1.03	.0113
0.60	0.	-9.0	0.44	.0092
0.60	-1.00	-8.8	0.43	.0093
0.60	-2.00	-8.1	0.44	.0092
0.60	-0.01	-10.5	0.44	.0093
0.60	1.00	-6.4	0.45	.0092
0.60	2.00	-8.6	0.48	.0090
0.60	4.00	-10.4	0.68	.0079
0.60	6.00	-9.0	0.71	.0077
0.60	8.00	-10.5	0.76	.0074
0.60	10.00	-8.0	0.69	.0078
0.60	12.00	-6.0	0.97	.0059
0.60	14.00	-19.4	0.95	.0060
0.60	16.00	-15.4	0.50	.0089
0.80	0.	-14.2	0.58	.0058
0.80	-1.00	-10.9	0.49	.0063
0.80	-2.00	-12.5	0.55	.0060
0.80	0.	-11.2	0.59	.0058
0.80	1.00	-13.5	0.76	.0046
0.80	2.00	-14.7	0.80	.0059
0.80	4.00	-13.6	0.64	.0055
0.80	6.00	-7.2	0.41	.0068
0.80	8.00	-12.7	0.62	.0056
0.80	10.00	-17.8	0.89	.0058
0.80	11.99	-14.9	0.59	.0057
0.80	14.00	-44.7	0.68	.0051
0.80	16.00	-18.4	0.40	.0068
$\Lambda = 50^\circ$; c.g. at $0.40\bar{c}$				
0.60	0.02	-11.2	-0.81	.0145
0.60	-1.99	-11.5	-0.71	.0143
0.60	-0.98	-12.5	-0.77	.0145
0.60	0.98	-11.1	-0.82	.0146
0.60	1.99	-10.6	-0.78	.0145
0.60	3.99	-15.3	-0.32	.0134
0.60	6.00	-10.9	-0.81	.0145
0.60	8.00	-20.4	0.10	.0122
0.60	10.02	-18.4	0.57	.0108
0.60	12.00	-26.8	1.07	.0093
0.60	13.99	-23.0	1.54	.0074
0.60	16.00	-21.7	1.17	.0088
0.80	0.	-10.7	-0.91	.0117
0.80	-1.99	-13.0	-0.80	.0115
0.80	-1.00	-12.7	-0.87	.0117
0.80	1.00	-11.4	-0.92	.0118
0.80	2.00	-13.8	-0.87	.0117
0.80	3.99	-14.0	-0.56	.0110
0.80	6.01	-22.0	-0.49	.0108
0.80	7.99	-26.4	0.55	.0081
0.80	10.00	-21.4	0.84	.0071
0.80	11.99	-26.8	1.24	.0056
0.80	13.98	-26.8	1.30	.0053
0.80	16.01	-15.6	0.42	.0085
0.90	0.	-9.9	-1.11	.0111
0.90	-2.00	-12.5	-1.00	.0109
0.90	-1.01	-12.0	-1.06	.0111
0.90	1.00	-9.9	-1.19	.0113
0.90	1.99	-10.8	-1.33	.0115
0.90	4.01	-12.8	-1.10	.0111
0.90	6.02	-29.6	-0.17	.0091
0.90	8.00	-43.7	0.99	.0057
0.90	9.99	-28.8	0.86	.0062
0.90	12.00	-32.9	1.26	.0045
0.90	14.01	-17.8	0.39	.0076
0.90	16.00	-18.2	0.21	.0081
1.70	0.55	-8.7	-0.96	.0050
1.70	-0.56	-8.2	-1.00	.0051
1.70	0.51	-11.4	-0.98	.0050
1.70	1.48	-11.7	-1.01	.0051
1.70	2.50	-7.6	-1.04	.0051
1.70	4.50	-12.2	-1.00	.0051
1.70	6.51	-16.8	-0.88	.0049
1.70	8.48	-18.0	-0.83	.0049
1.70	10.45	-16.9	-0.96	.0050
1.70	12.50	-29.9	-0.33	.0043
1.70	14.46	-18.4	-1.03	.0051
1.70	16.49	-24.5	-1.14	.0052
1.70	0.47	-10.9	-0.96	.0050
2.50	1.05	-9.7	-0.53	.0037
2.50	-3.95	-15.8	-0.30	.0034
2.50	-2.89	-15.5	-0.35	.0035
2.50	-0.91	-6.2	-0.42	.0036
2.50	0.08	-13.0	-0.48	.0036
2.50	1.08	-8.5	-0.52	.0037
2.50	2.13	-18.3	-0.53	.0037
2.50	3.08	-13.9	-0.53	.0037
2.50	5.07	-20.4	-0.59	.0037
2.50	7.10	-7.9	-0.71	.0038
2.50	9.10	-17.4	-0.83	.0039
2.50	11.06	-15.2	-0.81	.0039
2.50	13.05	-12.5	-0.75	.0039
2.50	15.13	-19.0	-0.74	.0039
2.50	17.09	-22.9	-0.76	.0039
2.50	1.04	-16.7	-0.49	.0036

TABLE VIII.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH HORIZONTAL TAIL REMOVED – Concluded

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 72.5°$; c.g. at $0.40\bar{c}$				
0.80	0.	-13.6	-0.03	.0096
0.80	-2.00	-13.5	-0.10	.0098
0.80	-1.00	-12.1	-0.05	.0097
0.80	0.01	-14.6	-0.04	.0096
0.80	1.00	-14.5	-0.00	.0095
0.80	1.99	-14.4	-0.03	.0096
0.80	3.99	-12.3	-0.53	.0109
0.80	6.01	-11.8	-0.43	.0106
0.80	7.99	-11.3	-0.73	.0113
0.80	10.01	-17.6	0.13	.0091
0.80	11.99	-18.7	0.41	.0083
0.80	14.01	-21.0	0.54	.0079
0.80	16.00	-22.4	0.42	.0083
1.00	0.	-16.3	-0.37	.0087
1.00	-2.01	-16.9	-0.43	.0089
1.00	-0.99	-14.8	-0.40	.0088
1.00	0.	-14.5	-0.35	.0087
1.00	1.00	-15.7	-0.29	.0086
1.00	1.99	-15.6	-0.25	.0085
1.00	4.00	-8.3	-0.85	.0098
1.00	5.99	-9.5	-0.65	.0094
1.00	8.00	-4.4	-0.61	.0093
1.00	10.00	-2.7	-0.66	.0094
1.00	12.01	-10.1	-0.20	.0083
1.00	14.01	-9.8	0.04	.0077
1.00	16.01	-10.4	-0.41	.0088
1.20	-0.01	-14.2	-0.65	.0081
1.20	-2.01	-15.1	-0.69	.0082
1.20	-1.00	-15.0	-0.67	.0082
1.20	0.01	-13.8	-0.66	.0082
1.20	0.98	-14.9	-0.61	.0081
1.20	2.00	-12.7	-0.71	.0083
1.20	3.99	-13.9	-1.09	.0090
1.20	6.02	-16.6	-0.77	.0084
1.20	8.01	-10.6	-1.29	.0094
1.20	9.99	-19.7	-0.59	.0080
1.20	9.99	-18.7	-0.66	.0082
1.20	12.02	-19.0	-0.50	.0078
1.20	14.01	-19.7	-0.53	.0079
1.20	16.01	-19.2	-0.96	.0087

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 72.5°$; c.g. at $0.40\bar{c}$				
1.70	0.52	-18.8	-0.93	.0049
1.70	-0.55	-15.2	-0.88	.0049
1.70	1.46	-17.9	-1.02	.0050
1.70	2.48	-14.7	-1.18	.0052
1.70	4.46	-16.8	-1.32	.0053
1.70	6.49	-16.5	-1.05	.0050
1.70	8.47	-23.4	-0.86	.0048
1.70	10.49	-27.3	-0.70	.0046
1.70	12.46	-31.7	-0.49	.0044
1.70	14.49	-31.0	-0.68	.0046
1.70	16.52	-30.0	-0.86	.0049
1.70	0.46	-15.9	-0.94	.0049
2.16	1.43	-16.2	-0.76	.0041
2.16	0.46	-16.2	-0.76	.0041
2.16	-0.57	-14.6	-0.73	.0041
2.16	-2.57	-19.5	-0.56	.0039
2.16	-4.58	-21.7	-0.58	.0039
2.16	2.42	-14.8	-0.83	.0042
2.16	3.44	-18.4	-0.88	.0042
2.16	5.45	-16.7	-0.74	.0041
2.16	7.44	-18.4	-0.67	.0040
2.16	9.47	-20.5	-0.58	.0039
2.16	11.40	-25.3	-0.57	.0039
2.16	13.44	-19.7	-0.73	.0041
2.16	15.39	-32.6	-0.74	.0041
2.16	17.42	-28.2	-0.87	.0042
2.16	1.42	-17.9	-0.76	.0041
2.50	1.08	-1.3	-0.59	.0037
2.50	0.08	-3.8	-0.62	.0037
2.50	-0.92	-9.4	-0.57	.0037
2.50	-2.92	-14.0	-0.53	.0036
2.50	-4.40	-21.5	-0.55	.0036
2.50	2.07	-18.2	-0.57	.0037
2.50	3.06	-16.1	-0.63	.0037
2.50	5.07	-23.1	-0.70	.0038
2.50	7.10	-18.5	-0.63	.0037
2.50	9.09	-26.1	-0.68	.0038
2.50	11.09	-21.6	-0.51	.0036
2.50	13.11	-17.5	-0.60	.0037
2.50	15.10	-24.2	-0.71	.0038
2.50	17.07	-28.1	-0.77	.0038
2.50	1.09	-16.8	-0.60	.0037

TABLE IX.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF BASIC CONFIGURATION A WITH ENGINE INLETS PLUGGED

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
$\Lambda = 20°$; c.g. at $0.30\bar{c}$				
0.40	0.02	-31.2	-0.48	.0188
0.40	-2.00	-31.8	-0.52	.0189
0.40	-1.00	-31.1	-0.54	.0189
0.40	1.00	-30.2	-0.35	.0184
0.40	2.01	-28.5	-0.39	.0185
0.40	3.98	-28.9	-0.63	.0191
0.40	6.00	-30.8	-0.79	.0195
0.40	8.00	-34.7	-0.77	.0194
0.40	10.01	-37.8	-0.46	.0186
0.40	12.01	-34.0	-0.61	.0190
0.40	14.01	-20.2	-1.10	.0202
0.40	16.01	-22.0	-1.40	.0209
0.60	-0.01	-31.2	-0.50	.0131
0.60	-2.00	-34.0	-0.53	.0131
0.60	-0.99	-31.6	-0.55	.0132
0.60	0.97	-31.6	-0.36	.0127
0.60	2.01	-31.6	-0.36	.0127
0.60	4.00	-35.2	-0.39	.0128
0.60	6.01	-39.4	-0.48	.0130
0.60	8.01	-35.2	-0.80	.0138
0.60	9.97	-42.4	-0.66	.0135
0.60	12.02	-29.5	-1.08	.0144
0.60	14.02	-17.0	-1.77	.0158
0.60	16.00	-47.8	-1.71	.0157
0.80	-0.02	-45.1	-0.25	.0097
0.80	-1.99	-45.2	-0.45	.0101
0.80	-1.00	-42.9	-0.50	.0103
0.80	1.00	-45.1	0.09	.0088
0.80	1.99	-45.1	0.27	.0084
0.80	4.00	-35.9	-0.28	.0098
0.80	6.00	-31.6	-1.24	.0118
0.80	8.00	-9.4	-2.11	.0134
0.80	10.01	-49.9	-1.56	.0124
0.80	11.99	-51.3	-1.75	.0128
0.80	13.99	-44.9	-1.52	.0124
0.80	16.01	-33.0	-1.69	.0127
$\Lambda = 72.5°$; c.g. at $0.40\bar{c}$				
0.80	-0.01	-29.2	-0.59	.0102
0.80	-2.00	-29.4	-0.64	.0103
0.80	-1.00	-28.8	-0.54	.0101
0.80	0.	-28.6	-0.58	.0102
0.80	0.99	-30.3	-0.67	.0104
0.80	2.00	-27.8	-0.81	.0107
0.80	4.00	-28.7	-1.61	.0122
0.80	6.00	-29.4	-2.12	.0131
0.80	8.00	-25.9	-2.59	.0139
0.80	10.00	-34.4	-2.21	.0133
0.80	12.00	-37.1	-2.18	.0132
1.00	-0.01	-35.1	-0.90	.0092
1.00	-2.00	-34.2	-1.29	.0099
1.00	-1.00	-33.3	-0.99	.0093
1.00	0.	-33.0	-0.92	.0092
1.00	1.00	-34.4	-1.01	.0094
1.00	2.00	-32.7	-1.40	.0101
1.00	4.00	-27.9	-2.45	.0117
1.00	6.00	-24.9	-3.06	.0126
1.00	8.00	-21.0	-4.06	.0126
1.00	10.00	-8.9	-4.11	.0126
1.00	12.00	-44.8	-3.54	.0126
1.20	0.	-32.0	-1.71	.0094
1.20	-2.00	-31.9	-1.89	.0097
1.20	-1.00	-32.6	-1.71	.0094
1.20	-0.01	-32.9	-1.70	.0094
1.20	1.00	-32.0	-1.85	.0096
1.20	2.00	-30.8	-2.08	.0099
1.20	4.00	-27.8	-2.75	.0109
1.20	6.00	-24.5	-3.72	.0109
1.20	8.00	-26.4	-3.76	.0109
1.20	10.00	-30.9	-3.75	.0109
1.20	12.00	-29.3	-3.81	.0109

TABLE X.- DYNAMIC STABILITY CHARACTERISTICS IN PITCH OF CONFIGURATION B

Mach number, M	Mean angle of attack, α, deg	Damping parameter, $C_{m_q} + C_{m_{\dot{\alpha}}}$ per radian	Oscillatory-stability parameter, $C_{m_\alpha} - k^2 C_{m_{\dot{q}}}$ per radian	Reduced-frequency parameter, k
Basic ; $\Lambda = 20°$; c.g. at $0.30\bar{c}$				
0.60	0.	-28.7	-1.08	.0141
0.60	-1.98	-28.7	-1.14	.0142
0.60	-1.00	-27.9	-1.17	.0143
0.60	0.	-28.2	-1.07	.0141
0.60	1.00	-27.2	-1.03	.0139
0.60	1.98	-28.0	-0.95	.0137
0.60	4.01	-31.1	-0.91	.0136
0.60	5.98	-36.2	-0.70	.0129
0.60	8.01	-31.1	-0.86	.0134
0.60	10.02	-25.0	-1.05	.0140
0.60	12.00	-24.0	-1.42	.0150
0.60	13.99	-24.0	-1.89	.0162
0.60	16.00	-31.2	-2.85	.0185
Basic ; $\Lambda = 72.5°$; c.g. at $0.40\bar{c}$				
0.80	0.	-33.8	-0.49	.0112
0.80	-2.00	-33.5	-0.61	.0115
0.80	-1.00	-33.8	-0.48	.0112
0.80	0.	-33.4	-0.50	.0113
0.80	1.00	-34.2	-0.56	.0114
0.80	2.00	-34.5	-0.68	.0117
0.80	4.00	-33.5	-1.54	.0136
0.80	6.00	-32.8	-1.76	.0141
0.80	8.00	-35.9	-2.01	.0146
0.80	10.00	-41.8	-1.71	.0140
0.80	12.00	-44.5	-1.69	.0140
Basic ; $\Lambda = 72.5°$; c.g. at $0.40\bar{c}$				
1.20	0.01	-30.4	-2.20	.0106
1.20	-2.00	-30.2	-2.40	.0109
1.20	-1.01	-29.5	-2.23	.0106
1.20	1.01	-30.3	-2.35	.0109
1.20	2.00	-30.3	-2.63	.0113
1.20	4.02	-25.0	-3.61	.0128
1.20	6.02	-24.2	-3.77	.0130
1.20	8.01	-27.5	-4.51	.0141
Horizontal tail removed ; $\Lambda = 72.5°$; c.g. at $0.40\bar{c}$				
2.16	1.43	-14.3	-0.99	.0044
2.16	-2.55	-14.7	-1.01	.0044
2.16	-0.57	-6.8	-1.15	.0045
2.16	0.45	-16.9	-1.08	.0045
2.16	2.43	-15.4	-1.09	.0045
2.16	3.45	-9.8	-1.08	.0045
2.16	5.45	-16.2	-0.88	.0043
2.16	7.48	-20.8	-0.78	.0042
2.16	9.44	-26.0	-0.62	.0040
2.16	11.41	-20.7	-0.78	.0042
2.16	13.43	-18.3	-0.86	.0042
2.16	15.44	-27.3	-0.94	.0043
2.16	17.44	-33.7	-1.06	.0044
2.16	1.44	-14.7	-0.98	.0044

TABLE XI. - DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION A

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$, per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$, per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$, per radian
$\Lambda = 20°$; c.g. at $0.30\bar{c}$					
0.40	-0.02	-0.281	0.100	.1083	-0.058
0.40	-1.99	-0.289	0.101	.1085	-0.046
0.40	-1.02	-0.267	0.103	.1087	-0.050
0.40	1.01	-0.262	0.101	.1085	-0.060
0.40	2.00	-0.276	0.101	.1085	-0.070
0.40	4.00	-0.278	0.103	.1087	-0.082
0.40	6.02	-0.284	0.104	.1089	-0.094
0.40	8.00	-0.258	0.114	.1103	-0.108
0.40	10.00	-0.256	0.118	.1108	-0.132
0.40	12.00	-0.239	0.112	.1099	-0.110
0.40	14.01	-0.242	0.085	.1057	-0.166
0.40	16.01	-0.424	0.050	.1006	-0.190
0.60	0.	-0.242	0.106	.0784	-0.063
0.60	-2.00	-0.294	0.105	.0784	-0.053
0.60	-1.00	-0.278	0.105	.0784	-0.061
0.60	1.00	-0.254	0.104	.0782	-0.072
0.60	2.00	-0.268	0.107	.0786	-0.077
0.60	4.01	-0.260	0.107	.0786	-0.090
0.60	6.00	-0.271	0.109	.0789	-0.110
0.60	8.01	-0.261	0.123	.0807	-0.107
0.60	10.00	-0.281	0.113	.0794	-0.133
0.60	12.01	-0.259	0.109	.0789	-0.106
0.60	14.00	-0.236	0.106	.0785	-0.142
0.60	16.01	-0.324	0.059	.0722	-0.207
0.80	-0.01	-0.283	0.126	.0654	-0.067
0.80	-1.99	-0.326	0.125	.0652	-0.052
0.80	-1.00	-0.267	0.126	.0654	-0.069
0.80	0.	-0.286	0.124	.0652	-0.068
0.80	0.99	-0.272	0.130	.0660	-0.044
0.80	2.01	-0.275	0.133	.0663	-0.023
0.80	4.00	-0.253	0.133	.0662	-0.030
0.80	6.02	-0.284	0.139	.0669	-0.066
0.80	8.01	-0.277	0.137	.0667	-0.093
0.80	10.01	-0.301	0.132	.0661	-0.100
0.80	12.01	-0.259	0.123	.0651	-0.133
0.80	14.00	-0.220	0.123	.0651	-0.162
0.80	16.01	-0.461	0.100	.0623	-0.112
$\Lambda = 50°$; c.g. at $0.40\bar{c}$					
0.60	-0.01	-0.234	0.091	.0788	-0.060
0.60	-2.00	-0.240	0.097	.0796	-0.042
0.60	-1.01	-0.237	0.096	.0794	-0.054
0.60	-0.01	-0.209	0.097	.0796	-0.061
0.60	0.99	-0.219	0.097	.0796	-0.072
0.60	1.99	-0.212	0.096	.0794	-0.083
0.60	4.00	-0.217	0.090	.0785	-0.098
0.60	6.01	-0.229	0.089	.0784	-0.107
0.60	8.01	-0.216	0.111	.0813	-0.074
0.60	9.99	-0.217	0.105	.0807	-0.056
0.60	12.02	-0.233	0.099	.0798	-0.082
0.60	14.01	-0.255	0.087	.0782	-0.108
0.60	16.03	-0.280	0.069	.0757	-0.121
0.60	0.	-0.234	0.095	.0784	-0.062
0.60	-2.00	-0.239	0.093	.0781	-0.043
0.60	-1.00	-0.254	0.092	.0782	-0.053
0.60	0.	-0.246	0.095	.0784	-0.057
0.60	1.00	-0.254	0.094	.0782	-0.070
0.60	2.00	-0.243	0.092	.0778	-0.077
0.60	4.00	-0.255	0.090	.0778	-0.098
0.60	6.00	-0.244	0.090	.0776	-0.105
0.60	8.00	-0.238	0.102	.0794	-0.082
0.60	10.00	-0.262	0.103	.0794	-0.078
0.60	12.00	-0.261	0.095	.0785	-0.076
0.60	14.00	-0.267	0.085	.0769	-0.100
0.60	15.99	-0.294	0.070	.0749	-0.118
0.80	-0.01	-0.231	0.104	.0648	-0.067
0.80	-2.00	-0.236	0.109	.0654	-0.045
0.80	-1.00	-0.217	0.107	.0650	-0.056
0.80	-0.02	-0.238	0.108	.0651	-0.067
0.80	1.01	-0.244	0.102	.0644	-0.077
0.80	2.00	-0.255	0.103	.0644	-0.091
0.80	4.01	-0.246	0.100	.0640	-0.122
0.80	5.99	-0.228	0.105	.0649	-0.124
0.80	8.00	-0.227	0.118	.0665	-0.054
0.80	10.01	-0.221	0.109	.0653	-0.045
0.80	11.98	-0.198	0.110	.0653	-0.074
0.80	14.01	-0.266	0.099	.0639	-0.094
0.80	16.01	-0.262	0.136	.0683	-0.102
$\Lambda = 50°$; c.g. at $0.40\bar{c}$					
0.80	0.	-0.256	0.096	[illegible]	-0.063
0.80	-2.00	-0.258	0.101	.0638	-0.045
0.80	-1.00	-0.211	0.099	.0634	-0.057
0.80	0.	-0.241	0.099	.0634	-0.069
0.80	1.00	-0.233	0.098	.0633	-0.077
0.80	2.00	-0.235	0.096	.0631	-0.092
0.80	4.00	-0.237	0.090	.0620	-0.111
0.80	6.00	-0.221	0.094	.0629	-0.117
0.80	8.00	-0.212	0.108	.0647	-0.055
0.80	8.00	-0.220	0.108	.0645	-0.055
0.80	9.99	-0.204	0.102	.0638	-0.054
0.80	12.00	-0.227	0.101	.0638	-0.072
0.80	14.00	-0.273	0.096	.0628	-0.116
0.80	16.00	-0.500	0.093	.0628	-0.101
0.90	0.	-0.223	0.115	.0604	-0.071
0.90	-2.01	-0.237	0.119	.0610	-0.048
0.90	-1.00	-0.220	0.121	.0613	-0.065
0.90	0.	-0.270	0.114	.0604	-0.072
0.90	1.00	-0.257	0.111	.0601	-0.088
0.90	2.01	-0.265	0.111	.0601	-0.094
0.90	3.99	-0.269	0.117	.0608	-0.120
0.90	6.00	-0.228	0.136	.0629	-0.088
0.90	7.99	-0.196	0.130	.0623	-0.032
0.90	9.99	-0.211	0.116	.0606	-0.041
0.90	12.00	-0.270	0.108	.0598	-0.077
0.90	14.00	-0.302	0.114	.0604	-0.071
0.90	16.01	-0.316	0.143	.0637	-0.078
0.90	0.	-0.254	0.106	.0585	-0.072
0.90	-2.00	-0.243	0.111	.0589	-0.046
0.90	-1.00	-0.237	0.111	.0589	-0.061
0.90	0.	-0.228	0.107	.0585	-0.071
0.90	1.00	-0.241	0.108	.0585	-0.089
0.90	2.00	-0.251	0.104	.0580	-0.100
0.90	4.00	-0.257	0.110	.0590	-0.123
0.90	6.00	-0.229	0.125	.0608	-0.086
0.90	8.00	-0.203	0.123	.0604	-0.033
0.90	10.00	-0.237	0.109	.0588	-0.035
0.90	11.99	-0.283	0.098	.0574	-0.083
0.90	14.00	-0.662	0.087	.0561	-0.057
0.90	16.00	-0.736	0.094	.0573	-0.069
0.90	16.00	-0.704	0.098	.0575	-0.068
1.70	0.50	-0.343	0.161	.0348	-0.091
1.70	-0.53	-0.359	0.161	.0348	-0.091
1.70	0.48	-0.345	0.161	.0348	-0.084
1.70	1.45	-0.267	0.164	.0350	-0.086
1.70	2.48	-0.392	0.161	.0348	-0.086
1.70	4.49	-0.349	0.153	.0344	-0.084
1.70	6.48	-0.282	0.151	.0344	-0.091
1.70	8.52	-0.189	0.159	.0347	-0.104
1.70	10.44	-0.170	0.143	.0340	-0.102
1.70	0.46	-0.286	0.164	.0350	-0.083
2.50	1.07	-0.329	0.076	.0250	-0.062
2.50	0.09	-0.213	0.069	.0246	-0.049
2.50	-0.89	-0.371	0.068	.0246	-0.055
2.50	-2.92	-0.166	0.073	.0249	-0.051
2.50	-3.90	-0.153	0.080	.0251	-0.056
2.50	1.09	-0.299	0.080	.0252	-0.061
2.50	2.09	-0.369	0.074	.0249	-0.059
2.50	3.08	-0.206	0.075	.0250	-0.068
2.50	5.07	-0.311	0.059	.0242	-0.068
2.50	7.09	-0.266	0.064	.0245	-0.085
2.50	9.07	-0.230	0.075	.0249	-0.088
2.50	11.10	-0.231	0.073	.0248	-0.086
2.50	13.07	-0.184	0.088	.0255	-0.116
2.50	15.08	-0.181	0.096	.0258	-0.139
2.50	17.09	-0.163	0.087	.0255	-0.138
2.50	1.06	-0.214	0.078	.0251	-0.064
$\Lambda = 72.5°$; c.g. at $0.40\bar{c}$					
0.80	0.01	-0.202	0.115	.0679	-0.045
0.80	-1.99	-0.275	0.119	.0684	-0.030
0.80	-1.00	-0.257	0.117	.0681	-0.038
0.80	1.00	-0.220	0.107	.0669	-0.053
0.80	2.00	-0.249	0.099	.0660	-0.063
0.80	4.02	-0.251	0.094	.0652	-0.077
0.80	6.01	-0.237	0.102	.0663	-0.098
0.80	8.00	-0.231	0.102	.0663	-0.106
0.80	10.01	-0.266	0.116	.0680	-0.150
0.80	11.99	-0.230	0.131	.0698	-0.172

TABLE XI.- DYNAMIC STABILITY CHARACTERISTICS IN YAW

OF BASIC CONFIGURATION A – Concluded

Mach number, M	Angle of attack, α deg	Damping parameter, $C_{n_r} - C_{n_{\dot\beta}} \cos \alpha$ per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot r}}$ per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot r}}$ per radian
$\Lambda = 72.5°$; c.g. at $0.40\bar{c}$					
1.00	-0.01	-0.198	0.122	.0585	-0.049
1.00	-1.99	-0.234	0.138	.0601	-0.036
1.00	-0.98	-0.266	0.126	.0589	-0.042
1.00	0.	-0.239	0.124	.0586	-0.049
1.00	1.00	-0.231	0.116	.0577	-0.056
1.00	1.99	-0.238	0.109	.0570	-0.064
1.00	4.00	-0.237	0.094	.0552	-0.079
1.00	6.00	-0.238	0.108	.0569	-0.107
1.00	8.01	-0.246	0.124	.0587	-0.110
1.00	10.00	-0.268	0.117	.0578	-0.147
1.00	12.00	-0.462	0.122	.0583	-0.153
1.20	-0.01	-0.276	0.176	.0569	-0.053
1.20	-1.99	-0.332	0.214	.0605	-0.041
1.20	-1.01	-0.283	0.190	.0584	-0.047
1.20	1.00	-0.232	0.164	.0558	-0.063
1.20	2.00	-0.250	0.154	.0549	-0.073
1.20	4.01	-0.231	0.132	.0525	-0.092
1.20	6.00	-0.255	0.129	.0522	-0.120
1.20	7.99	-0.248	0.111	.0504	-0.124
1.20	10.00	-0.252	0.147	.0542	-0.141
1.20	12.00	-0.467	0.172	.0565	-0.146
1.70	0.49	-0.294	0.136	.0344	-0.097
1.70	-0.53	-0.299	0.141	.0348	-0.085
1.70	0.50	-0.238	0.139	.0347	-0.100
1.70	1.48	-0.355	0.137	.0345	-0.110
1.70	2.45	-0.214	0.138	.0345	-0.122
1.70	4.49	-0.449	0.131	.0342	-0.143
1.70	5.55	-0.469	0.137	.0345	-0.151
1.70	8.48	-0.344	0.128	.0341	-0.161
1.70	10.45	-0.476	0.114	.0334	-0.153
1.70	12.48	-0.371	0.105	.0328	-0.145
1.70	14.46	-0.329	0.108	.0331	-0.133
1.70	0.49	-0.377	0.137	.0345	-0.098
2.16	1.40	-0.262	0.094	.0282	-0.089
2.16	0.44	-0.272	0.095	.0283	-0.083
2.16	-0.56	-0.271	0.098	.0284	-0.075
2.16	-2.57	-0.335	0.102	.0286	-0.057
2.16	-3.56	-0.381	0.104	.0286	-0.048
2.16	1.43	-0.292	0.093	.0282	-0.089
2.16	2.44	-0.292	0.089	.0280	-0.094
2.16	3.42	-0.318	0.091	.0281	-0.100
2.16	5.45	-0.497	0.077	.0274	-0.102
2.16	7.44	-0.370	0.088	.0279	-0.100
2.16	9.43	-0.373	0.080	.0275	-0.103
2.16	11.45	-0.351	0.069	.0270	-0.104
2.16	13.42	-0.375	0.060	.0266	-0.106
2.16	15.44	-0.378	0.053	.0263	-0.107
2.16	17.42	-0.396	0.037	.0255	-0.106
2.16	1.44	-0.299	0.095	.0283	-0.087
2.50	1.08	-0.241	0.088	.0260	-0.072
2.50	0.08	-0.498	0.079	.0256	-0.066
2.50	-0.93	-0.346	0.078	.0256	-0.064
2.50	-2.92	-0.547	0.088	.0260	-0.055
2.50	-3.89	-0.619	0.083	.0259	-0.048
2.50	1.07	-0.284	0.087	.0259	-0.071
2.50	2.09	-0.381	0.090	.0261	-0.073
2.50	3.10	-0.303	0.086	.0259	-0.073
2.50	5.08	-0.401	0.067	.0251	-0.079
2.50	7.07	-0.402	0.060	.0248	-0.080
2.50	9.10	-0.369	0.064	.0250	-0.085
2.50	11.08	-0.380	0.062	.0249	-0.087
2.50	13.08	-0.364	0.053	.0245	-0.090
2.50	15.07	-0.396	0.050	.0244	-0.087
2.50	17.07	-0.457	0.038	.0238	-0.091
2.50	1.08	-0.274	0.087	.0260	-0.072

TABLE XII.- DYNAMIC STABILITY CHARACTERISTICS IN YAW

OF BASIC CONFIGURATION A WITH $i_t = -20^{\circ}$

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$ per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$ per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$ per radian
$\Lambda = 20^{\circ}$; c.g. at $0.30\bar{c}$					
0.40	0.	-0.316	0.126	.1118	-0.065
0.40	-2.00	-0.339	0.145	.1144	-0.055
0.40	-0.99	-0.309	0.133	.1128	-0.060
0.40	-0.01	-0.283	0.129	.1122	-0.071
0.40	1.00	-0.301	0.123	.1114	-0.065
0.40	2.00	-0.286	0.126	.1118	-0.072
0.40	4.00	-0.280	0.118	.1108	-0.081
0.40	6.02	-0.281	0.109	.1095	-0.102
0.40	8.00	-0.256	0.102	.1085	-0.102
0.40	10.00	-0.253	0.088	.1065	-0.123
0.40	12.01	-0.236	0.052	.1012	-0.147
0.40	14.00	-0.280	0.029	.0976	-0.127
0.40	16.00	-0.545	-0.022	.0892	-0.214
0.60	0.	-0.484	0.213	.0911	-0.084
0.60	-2.01	-0.549	0.311	.1014	-0.071
0.60	-1.00	-0.493	0.283	.0986	-0.081
0.60	0.01	-0.474	0.246	.0947	-0.087
0.60	1.00	-0.473	0.202	.0899	-0.077
0.60	2.01	-0.375	0.172	.0864	-0.084
0.60	4.00	-0.288	0.123	.0805	-0.091
0.60	6.00	-0.310	0.097	.0773	-0.126
0.60	8.01	-0.309	0.100	.0776	-0.102
0.60	9.99	-0.290	0.077	.0745	-0.084
0.60	12.00	-0.279	0.041	.0695	-0.111
0.60	14.02	-0.303	0.029	.0677	-0.129
0.60	16.03	-0.592	-0.012	.0611	-0.120
0.60	0.	-0.485	0.224	.0924	-0.084
0.80	0.	-0.918	0.339	.0864	-0.103
0.80	-2.01	-1.045	0.475	.0975	-0.088
0.80	-0.99	-1.037	0.376	.0895	-0.110
0.80	0.	-0.878	0.346	.0869	-0.107
0.80	1.00	-0.821	0.311	.0838	-0.054
0.80	2.00	-0.677	0.274	.0805	-0.042
0.80	3.99	-0.444	0.165	.0697	-0.060
0.80	6.01	-0.327	0.113	.0638	-0.059
0.80	7.99	-0.291	0.086	.0605	-0.085
0.80	9.98	-0.326	0.074	.0589	-0.091
0.80	12.00	-0.287	0.065	.0579	-0.057
0.80	14.00	-0.363	0.028	.0528	-0.215
0.80	16.01	-0.321	0.021	.0515	-0.126
$\Lambda = 72.5^{\circ}$; c.g. at $0.40\bar{c}$					
0.80	-0.01	-0.446	0.248	.0823	-0.051
0.80	-2.01	-0.472	0.309	.0882	-0.030
0.80	-1.00	-0.436	0.281	.0854	-0.042
0.80	-0.01	-0.445	0.256	.0831	-0.053
0.80	-0.01	-0.446	0.253	.0828	-0.052
0.80	1.00	-0.484	0.219	.0793	-0.059
0.80	2.00	-0.475	0.195	.0768	-0.064
0.80	4.01	-0.445	0.146	.0713	-0.085
0.80	5.99	-0.366	0.144	.0710	-0.096
0.80	8.00	-0.286	0.080	.0632	-0.088
0.80	10.00	-0.278	0.074	.0623	-0.124
0.80	11.99	-0.259	0.081	.0632	-0.134
0.80	14.00	-0.273	0.100	.0656	-0.110
0.80	16.00	-0.235	0.093	.0648	-0.103
0.80	0.	-0.477	0.239	.0814	-0.042
$\Lambda = 72.5^{\circ}$; c.g. at $0.40\bar{c}$					
1.00	0.	-0.662	0.426	.0855	-0.043
1.00	-2.00	-0.826	0.512	.0917	-0.037
1.00	-0.99	-0.768	0.481	.0895	-0.040
1.00	0.	-0.692	0.440	.0865	-0.043
1.00	1.00	-0.628	0.419	.0849	-0.053
1.00	2.01	-0.644	0.366	.0807	-0.058
1.00	3.99	-0.607	0.274	.0730	-0.101
1.00	5.99	-0.477	0.168	.0632	-0.128
1.00	7.99	-0.359	0.046	.0490	-0.156
1.00	9.99	-0.271	0.071	.0521	-0.171
1.00	12.00	-0.279	0.071	.0521	-0.169
1.00	14.00	-0.206	0.079	.0530	-0.166
1.00	16.00	0.035	0.113	.0571	-0.107
1.20	0.	-0.808	0.501	.0812	-0.038
1.20	-2.00	-0.922	0.592	.0869	-0.027
1.20	-0.99	-0.814	0.543	.0839	-0.032
1.20	0.01	-0.769	0.499	.0810	-0.039
1.20	0.99	-0.737	0.445	.0774	-0.047
1.20	2.00	-0.631	0.383	.0731	-0.062
1.20	4.00	-0.623	0.271	.0646	-0.099
1.20	6.00	-0.392	0.167	.0554	-0.130
1.20	7.99	-0.360	0.094	.0481	-0.126
1.20	10.00	-0.306	0.100	.0487	-0.150
1.20	11.99	-0.288	0.104	.0492	-0.147
1.20	13.99	-0.283	0.107	.0495	-0.137
1.20	16.00	-0.192	0.141	.0529	-0.107
1.70	0.45	-0.237	0.200	.0375	-0.098
1.70	1.48	-0.220	0.189	.0370	-0.114
1.70	2.45	-0.221	0.184	.0367	-0.116
1.70	4.48	-0.235	0.164	.0358	-0.162
1.70	6.47	-0.284	0.152	.0352	-0.178
1.70	8.48	-0.214	0.145	.0349	-0.170
1.70	10.48	-0.284	0.160	.0356	-0.119
1.70	12.47	-0.425	0.142	.0348	-0.154
1.70	14.51	-0.312	0.178	.0365	-0.155
1.70	16.45	-0.122	0.168	.0361	-0.151
1.70	0.49	-0.336	0.199	.0374	-0.098
2.16	1.51	-0.241	0.081	.0275	-0.091
2.16	-3.55	-0.243	0.120	.0294	-0.034
2.16	-2.56	-0.127	0.120	.0293	-0.042
2.16	-0.57	-0.128	0.116	.0291	-0.059
2.16	0.41	-0.122	0.102	.0286	-0.076
2.16	1.43	-0.099	0.084	.0277	-0.087
2.16	2.43	-0.090	0.082	.0276	-0.094
2.16	3.45	-0.137	0.080	.0275	-0.105
2.16	5.49	-0.292	0.077	.0274	-0.091
2.16	7.45	-0.237	0.077	.0274	-0.077
2.16	9.42	-0.165	0.088	.0279	-0.083
2.16	11.45	-0.254	0.053	.0263	-0.100
2.16	13.43	-0.318	0.039	.0255	-0.104
2.16	15.42	-0.252	0.069	.0270	-0.100
2.16	17.40	-0.251	0.094	.0282	-0.109
2.16	9.46	-0.210	0.088	.0279	-0.083
2.16	1.44	-0.249	0.081	.0276	-0.089
2.50	1.04	-0.065	0.083	.0258	-0.067
2.50	-3.91	-0.054	0.090	.0261	-0.037
2.50	-2.93	-0.255	0.087	.0260	-0.042
2.50	-0.92	0.067	0.074	.0254	-0.052
2.50	0.09	-0.066	0.079	.0256	-0.061
2.50	1.08	-0.055	0.083	.0258	-0.066
2.50	2.09	-0.136	0.082	.0258	-0.070
2.50	3.10	-0.150	0.070	.0252	-0.075
2.50	5.07	-0.253	0.050	.0243	-0.069
2.50	7.10	-0.260	0.046	.0241	-0.080
2.50	9.08	-0.280	0.058	.0247	-0.088
2.50	11.09	-0.434	0.054	.0245	-0.078
2.50	13.08	-0.261	0.047	.0242	-0.070
2.50	15.10	-0.214	0.039	.0238	-0.070
2.50	17.09	-0.279	0.055	.0246	-0.075
2.50	1.10	-0.194	0.086	.0259	-0.068

TABLE XIII. - DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION A WITH $i_t = -10^{\circ}$

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$, per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$, per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$, per radian
$\Lambda = 20^{\circ}$; c.g. at $0.30\bar{c}$					
0.40	0.01	-0.265	0.110	.1095	-0.052
0.40	-1.99	-0.281	0.110	.1095	-0.043
0.40	-0.99	-0.266	0.106	.1089	-0.050
0.40	0.01	-0.273	0.112	.1097	-0.048
0.40	1.00	-0.271	0.111	.1095	-0.062
0.40	2.01	-0.268	0.110	.1095	-0.067
0.40	4.00	-0.239	0.101	.1083	-0.077
0.40	6.00	-0.274	0.106	.1089	-0.083
0.40	8.00	-0.276	0.102	.1083	-0.100
0.40	10.00	-0.232	0.105	.1087	-0.129
0.40	11.99	-0.260	0.079	.1051	-0.121
0.40	14.00	-0.246	0.056	.1016	-0.162
0.40	16.01	-0.497	0.005	.0935	-0.263
0.60	-0.01	-0.323	0.122	.0804	-0.060
0.60	-2.01	-0.320	0.128	.0811	-0.046
0.60	-0.99	-0.298	0.127	.0809	-0.050
0.60	-0.01	-0.277	0.121	.0803	-0.063
0.60	1.01	-0.270	0.118	.0798	-0.064
0.60	2.01	-0.241	0.106	.0782	-0.073
0.60	4.00	-0.257	0.106	.0782	-0.084
0.60	5.99	-0.271	0.104	.0781	-0.109
0.60	8.00	-0.262	0.109	.0786	-0.102
0.60	10.00	-0.273	0.107	.0784	-0.085
0.60	12.00	-0.264	0.076	.0744	-0.114
0.60	14.01	-0.256	0.055	.0713	-0.126
0.60	16.00	-0.530	0.011	.0647	-0.198
0.80	0.	-0.288	0.130	.0656	-0.072
0.80	-2.01	-0.392	0.159	.0688	-0.057
0.80	-1.00	-0.343	0.142	.0670	-0.070
0.80	0.01	-0.294	0.133	.0661	-0.076
0.80	0.99	-0.299	0.130	.0657	-0.061
0.80	1.99	-0.305	0.128	.0654	-0.024
0.80	4.00	-0.304	0.123	.0648	-0.035
0.80	5.99	-0.294	0.119	.0643	-0.050
0.80	7.99	-0.302	0.112	.0635	-0.063
0.80	10.00	-0.294	0.098	.0619	-0.072
0.80	12.00	-0.215	0.081	.0598	-0.074
0.80	13.98	-0.331	0.057	.0566	-0.202
0.80	16.00	-0.294	0.050	.0557	-0.138
0.80	-0.01	-0.313	0.131	.0658	-0.072
$\Lambda = 72.5^{\circ}$; c.g. at $0.40\bar{c}$					
0.80	0.01	-0.299	0.135	.0707	-0.036
0.80	-1.99	-0.284	0.148	.0722	-0.020
0.80	-0.99	-0.297	0.143	.0716	-0.026
0.80	1.00	-0.260	0.128	.0699	-0.046
0.80	2.02	-0.269	0.121	.0691	-0.054
0.80	4.01	-0.235	0.106	.0672	-0.069
0.80	6.02	-0.197	0.097	.0663	-0.092
0.80	8.02	-0.216	0.079	.0638	-0.103
0.80	10.01	-0.237	0.089	.0651	-0.136
0.80	12.01	-0.241	0.096	.0660	-0.145
0.80	14.00	-0.287	0.103	.0668	-0.158
0.80	16.00	-0.227	0.092	.0654	-0.160
1.00	0.	-0.333	0.151	.0618	-0.046
1.00	-2.02	-0.428	0.180	.0648	-0.031
1.00	-1.01	-0.371	0.166	.0635	-0.040
1.00	0.99	-0.373	0.142	.0608	-0.055
1.00	2.01	-0.309	0.126	.0591	-0.062
1.00	4.00	-0.260	0.102	.0564	-0.087
1.00	6.02	-0.229	0.102	.0564	-0.110
1.00	8.00	-0.230	0.080	.0538	-0.116
1.00	10.01	-0.270	0.083	.0542	-0.153
1.00	12.01	-0.237	0.093	.0555	-0.166
1.00	14.01	-0.258	0.091	.0552	-0.189
1.00	16.01	-0.347	0.099	.0562	-0.166

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$, per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$, per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$, per radian
$\Lambda = 72.5^{\circ}$; c.g. at $0.40\bar{c}$					
1.20	-0.01	-0.426	0.232	.0622	-0.052
1.20	-1.99	-0.504	0.253	.0633	-0.036
1.20	-1.01	-0.493	0.230	.0619	-0.043
1.20	1.01	-0.346	0.201	.0594	-0.061
1.20	2.01	-0.321	0.186	.0579	-0.069
1.20	4.01	-0.249	0.163	.0558	-0.094
1.20	6.00	-0.261	0.138	.0533	-0.124
1.20	8.02	-0.281	0.102	.0495	-0.121
1.20	10.01	-0.269	0.120	.0515	-0.156
1.20	12.01	-0.268	0.120	.0516	-0.155
1.20	14.00	-0.302	0.107	.0501	-0.155
1.20	16.00	-0.535	0.137	.0532	-0.123
1.70	0.48	-0.287	0.160	.0357	-0.095
1.70	-0.52	-0.176	0.161	.0358	-0.087
1.70	0.48	-0.266	0.156	.0355	-0.096
1.70	1.47	-0.231	0.153	.0354	-0.109
1.70	2.49	-0.232	0.149	.0352	-0.120
1.70	4.47	-0.186	0.137	.0345	-0.158
1.70	6.49	-0.217	0.141	.0348	-0.179
1.70	8.50	-0.308	0.132	.0343	-0.175
1.70	10.48	-0.330	0.115	.0335	-0.144
1.70	12.48	-0.171	0.096	.0325	-0.137
1.70	14.48	-0.132	0.127	.0341	-0.121
1.70	16.49	0.136	0.142	.0348	-0.157
1.70	0.46	-0.263	0.159	.0357	-0.097
2.16	1.44	-0.249	0.081	.0277	-0.092
2.16	-3.56	-0.237	0.102	.0287	-0.043
2.16	-2.54	-0.264	0.102	.0287	-0.049
2.16	-0.58	-0.284	0.100	.0285	-0.065
2.16	0.42	-0.269	0.092	.0282	-0.080
2.16	1.45	-0.303	0.081	.0277	-0.093
2.16	2.43	-0.323	0.079	.0276	-0.100
2.16	3.45	-0.314	0.082	.0277	-0.104
2.16	5.45	-0.304	0.069	.0271	-0.099
2.16	7.42	-0.371	0.081	.0277	-0.095
2.16	9.44	-0.312	0.079	.0276	-0.100
2.16	11.44	-0.260	0.055	.0264	-0.103
2.16	13.39	-0.236	0.044	.0259	-0.111
2.16	15.46	-0.174	0.046	.0260	-0.112
2.16	17.41	-0.214	0.047	.0260	-0.109
2.16	1.46	-0.303	0.081	.0277	-0.090
2.50	1.07	-0.291	0.082	.0259	-0.072
2.50	-3.90	-0.302	0.077	.0256	-0.049
2.50	-2.92	-0.386	0.073	.0255	-0.050
2.50	-0.91	-0.256	0.071	.0254	-0.060
2.50	0.09	-0.282	0.079	.0257	-0.070
2.50	1.08	-0.378	0.085	.0260	-0.068
2.50	2.06	-0.181	0.084	.0259	-0.068
2.50	3.07	-0.207	0.073	.0255	-0.075
2.50	5.09	-0.267	0.056	.0247	-0.070
2.50	7.07	-0.356	0.053	.0246	-0.077
2.50	9.08	-0.351	0.064	.0251	-0.080
2.50	11.06	-0.318	0.053	.0246	-0.087
2.50	13.10	-0.185	0.046	.0242	-0.086
2.50	15.08	-0.157	0.034	.0237	-0.086
2.50	17.05	-0.157	0.035	.0237	-0.088
2.50	1.09	-0.260	0.081	.0258	-0.071

TABLE XIV. - DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION A WITH OSCILLATION AXIS AT 0.30$\bar{c}$

Mach number, M	Angle of attack, α deg	Damping parameter, $C_{n_r} - C_{n_{\dot\beta}} \cos \alpha$ per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot r}}$ per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot r}}$ per radian
$\Lambda = 72.5°$					
1.70	0.47	-0.478	0.146	.0344	-0.097
1.70	-0.52	-0.310	0.151	.0347	-0.086
1.70	0.48	-0.217	0.147	.0345	-0.104
1.70	1.47	-0.345	0.146	.0344	-0.113
1.70	2.48	-0.362	0.149	.0346	-0.125
1.70	4.49	-0.301	0.149	.0347	-0.148
1.70	6.48	-0.195	0.159	.0351	-0.162
1.70	8.48	-0.236	0.148	.0346	-0.163
1.70	10.48	-0.179	0.136	.0340	-0.157
1.70	12.47	-0.128	0.124	.0334	-0.149
1.70	14.47	-0.680	0.151	.0347	-0.132
1.70	16.45	-0.220	0.174	.0359	-0.161
1.70	0.47	-0.482	0.148	.0346	-0.102
2.50	1.06	-0.364	0.102	.0263	-0.069
2.50	0.09	-0.284	0.093	.0259	-0.068
2.50	-0.92	-0.181	0.103	.0263	-0.064
2.50	-2.90	-0.260	0.102	.0263	-0.054
2.50	-3.91	-0.220	0.097	.0261	-0.048
2.50	1.07	-0.290	0.096	.0260	-0.071
2.50	2.07	-0.177	0.100	.0262	-0.077
2.50	3.11	-0.298	0.095	.0260	-0.072
2.50	5.10	-0.288	0.082	.0255	-0.088
2.50	9.10	-0.226	0.083	.0255	-0.093
2.50	11.11	-0.170	0.064	.0247	-0.084
2.50	13.10	-0.118	0.061	.0245	-0.093
2.50	15.09	-0.355	0.056	.0243	-0.096
2.50	17.11	-0.285	0.046	.0238	-0.085
2.50	7.10	-0.209	0.078	.0252	-0.079
2.50	1.08	-0.179	0.102	.0263	-0.074

TABLE XV.- DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION A WITH VERTICAL TAIL AND VENTRAL FINS REMOVED

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$, per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$, per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$, per radian
$\Lambda = 20°$; c.g. at $0.30\bar{c}$					
0.40	-0.01	-0.102	-0.056	.0829	-0.025
0.40	-2.01	-0.114	-0.063	.0817	-0.016
0.40	-0.98	-0.136	-0.062	.0817	-0.016
0.40	0.	-0.124	-0.055	.0831	-0.030
0.40	1.00	-0.113	-0.056	.0831	-0.026
0.40	1.98	-0.107	-0.056	.0831	-0.039
0.40	4.01	-0.112	-0.054	.0833	-0.048
0.40	6.02	-0.122	-0.049	.0843	-0.070
0.40	7.99	-0.104	-0.038	.0866	-0.084
0.40	10.00	-0.098	-0.032	.0876	-0.113
0.40	12.01	-0.009	-0.040	.0860	-0.113
0.40	14.01	-0.059	-0.039	.0858	-0.108
0.40	15.99	-0.125	-0.066	.0799	-0.226
0.60	0.	-0.110	-0.065	.0511	-0.033
0.60	-2.01	-0.113	-0.064	.0513	-0.027
0.60	-0.99	-0.060	-0.065	.0511	-0.025
0.60	0.	-0.085	-0.066	.0511	-0.028
0.60	1.01	-0.114	-0.066	.0509	-0.049
0.60	2.02	-0.097	-0.065	.0512	-0.044
0.60	4.01	-0.101	-0.063	.0516	-0.057
0.60	6.01	-0.102	-0.054	.0535	-0.078
0.60	8.01	-0.133	-0.040	.0562	-0.078
0.60	10.00	-0.148	-0.037	.0567	-0.085
0.60	12.01	-0.117	-0.043	.0555	-0.099
0.60	14.00	-0.126	-0.033	.0575	-0.158
0.60	16.00	-0.173	-0.039	.0563	-0.081
0.80	-0.01	-0.053	-0.062	.0372	-0.029
0.80	-2.00	-0.074	-0.064	.0367	-0.024
0.80	-1.00	-0.101	-0.063	.0370	-0.033
0.80	0.	-0.126	-0.058	.0380	-0.036
0.80	0.99	-0.093	-0.058	.0380	0.013
0.80	2.00	-0.079	-0.055	.0388	0.016
0.80	4.01	-0.105	-0.055	.0388	0.001
0.80	6.01	-0.113	-0.044	.0408	-0.029
0.80	8.00	-0.129	-0.041	.0415	-0.057
0.80	10.02	-0.121	-0.040	.0415	-0.053
0.80	12.00	-0.104	-0.037	.0422	-0.096
0.80	14.00	-0.154	-0.027	.0440	-0.127
0.80	16.00	-0.372	-0.020	.0453	-0.085
$\Lambda = 50°$, c.g. at $0.40\bar{c}$					
0.60	0.	-0.084	-0.063	.0548	-0.031
0.60	-2.02	-0.081	-0.051	.0575	-0.011
0.60	-1.00	-0.090	-0.056	.0564	-0.024
0.60	0.	-0.099	-0.064	.0548	-0.030
0.60	1.01	-0.091	-0.063	.0550	-0.045
0.60	2.01	-0.080	-0.066	.0544	-0.050
0.60	4.01	-0.085	-0.069	.0536	-0.073
0.60	6.01	-0.074	-0.073	.0529	-0.087
0.60	8.00	-0.066	-0.054	.0568	-0.062
0.60	10.01	-0.096	-0.055	.0567	-0.042
0.60	12.01	-0.105	-0.059	.0558	-0.037
0.60	14.01	-0.062	-0.053	.0571	-0.087
0.60	16.02	-0.092	-0.055	.0566	-0.103
$\Lambda = 50°$; c.g. at $0.40\bar{c}$					
0.80	0.01	-0.073	-0.070	.0380	-0.038
0.80	-2.01	-0.081	-0.055	.0412	-0.012
0.80	0.01	-0.109	-0.070	.0380	-0.036
0.80	1.01	-0.136	-0.071	.0377	-0.051
0.80	2.00	-0.092	-0.072	.0375	-0.057
0.80	4.01	-0.103	-0.077	.0365	-0.091
0.80	6.01	-0.080	-0.066	.0389	-0.099
0.80	8.01	-0.105	-0.057	.0409	-0.023
0.80	10.03	-0.096	-0.062	.0397	-0.021
0.80	12.02	-0.106	-0.058	.0407	-0.046
0.80	14.02	-0.095	-0.052	.0419	-0.089
0.80	15.99	-0.086	-0.050	.0423	-0.101
0.80	0.01	-0.112	-0.069	.0383	-0.038
0.80	-0.99	-0.113	-0.062	.0398	-0.026
0.90	0.	-0.083	-0.071	.0329	-0.038
0.90	-2.02	-0.042	-0.060	.0352	-0.012
0.90	-1.00	-0.132	-0.067	.0338	-0.032
0.90	0.	-0.069	-0.073	.0325	-0.037
0.90	1.00	-0.108	-0.075	.0320	-0.055
0.90	2.00	-0.040	-0.074	.0323	-0.065
0.90	4.00	-0.093	-0.066	.0341	-0.095
0.90	5.99	-0.078	-0.052	.0371	-0.079
0.90	8.01	-0.059	-0.058	.0358	-0.012
0.90	10.01	-0.102	-0.065	.0343	-0.016
0.90	11.99	-0.096	-0.063	.0348	-0.063
0.90	14.01	-0.149	-0.051	.0373	-0.043
0.90	16.03	-0.538	-0.033	.0407	-0.080
0.90	0.01	-0.093	-0.073	.0325	-0.040
1.70	0.49	-0.256	-0.038	.0246	-0.028
1.70	-0.52	-0.127	-0.042	.0243	-0.026
1.70	0.48	-0.180	-0.036	.0246	-0.021
1.70	1.50	-0.286	-0.041	.0244	-0.030
1.70	2.48	-0.396	-0.037	.0247	-0.033
1.70	4.49	-0.297	-0.041	.0244	-0.032
1.70	6.49	-0.126	-0.039	.0246	-0.032
1.70	8.47	-0.083	-0.034	.0249	-0.054
1.70	10.48	-0.190	-0.039	.0244	-0.045
1.70	12.52	-0.213	-0.045	.0241	-0.062
1.70	14.48	-0.872	-0.011	.0264	-0.038
1.70	16.46	-1.059	0.039	.0295	-0.049
1.70	0.48	-0.439	-0.042	.0243	-0.031
2.50	1.11	-0.089	-0.041	.0195	-0.017
2.50	1.11	-0.197	-0.041	.0197	-0.028
2.50	0.09	-0.131	-0.054	.0190	-0.022
2.50	-0.90	-0.174	-0.061	.0186	-0.032
2.50	-2.90	-0.060	-0.063	.0185	-0.018
2.50	-3.91	-0.060	-0.062	.0185	-0.
2.50	1.09	-0.197	-0.041	.0197	-0.023
2.50	2.09	-0.233	-0.035	.0201	-0.035
2.50	3.09	-0.475	-0.033	.0201	-0.037
2.50	5.09	-0.102	-0.047	.0194	-0.039
2.50	7.10	-0.218	-0.036	.0200	-0.051
2.50	9.10	-0.241	-0.027	.0205	-0.065
2.50	11.06	-0.520	-0.030	.0204	-0.062
2.50	13.07	-0.306	-0.031	.0203	-0.072
2.50	15.08	-0.229	-0.027	.0205	-0.082
2.50	17.12	-0.341	-0.025	.0206	-0.098
2.50	1.09	-0.481	-0.040	.0198	-0.027

TABLE XV.- DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION A WITH VERTICAL TAIL AND VENTRAL FINS REMOVED – Concluded

Mach number, M	Angle of attack, α deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$ per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$ per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$ per radian
$\Lambda = 72.5°$; c.g. at 0.40$\bar{c}$					
0.80	0.	-0.051	-0.066	.0398	-0.015
0.80	-2.00	-0.042	-0.061	.0408	0.003
0.80	-1.00	-0.034	-0.064	.0403	-0.006
0.80	0.	-0.064	-0.066	.0397	-0.013
0.80	1.00	-0.057	-0.069	.0391	-0.024
0.80	2.03	-0.071	-0.072	.0385	-0.035
0.80	4.01	-0.074	-0.080	.0366	-0.049
0.80	6.00	-0.052	-0.070	.0391	-0.072
0.80	8.00	-0.071	-0.072	.0384	-0.085
0.80	10.00	-0.080	-0.053	.0427	-0.120
0.80	12.01	-0.079	-0.041	.0450	-0.146
0.80	14.00	-0.045	-0.038	.0459	-0.151
0.80	0.	-0.048	-0.068	.0395	-0.016
1.00	-2.00	-0.045	-0.071	.0298	-0.001
1.00	-1.01	-0.056	-0.075	.0290	-0.007
1.00	0.01	-0.083	-0.077	.0284	-0.016
1.00	0.99	-0.015	-0.080	.0274	-0.025
1.00	2.00	-0.086	-0.082	.0271	-0.036
1.00	4.01	-0.105	-0.084	.0265	-0.051
1.00	6.00	-0.058	-0.075	.0288	-0.082
1.00	8.01	-0.063	-0.070	.0301	-0.097
1.00	10.02	-0.059	-0.058	.0327	-0.116
1.00	12.02	-0.153	-0.051	.0342	-0.129
1.00	0.	-0.012	-0.077	.0284	-0.016
1.20	0.	-0.116	-0.047	.0292	-0.002
1.20	-2.01	-0.066	-0.038	.0307	-0.002
1.20	0.	-0.074	-0.046	.0293	-0.017
1.20	-2.00	-0.161	-0.040	.0304	-0.002
1.20	-1.00	-0.073	-0.044	.0298	-0.009
1.20	0.01	-0.051	-0.046	.0293	-0.018
1.20	1.00	-0.005	-0.050	.0284	-0.029
1.20	1.99	-0.076	-0.051	.0284	-0.038
1.20	4.00	-0.051	-0.061	.0262	-0.057
1.20	6.01	-0.127	-0.060	.0265	-0.083
1.20	8.00	-0.083	-0.064	.0256	-0.087
1.20	10.01	-0.080	-0.031	.0321	-0.103
1.20	12.01	-0.412	-0.011	.0354	-0.112
1.20	-0.01	-0.072	-0.040	.0304	-0.016
1.20	0.03	-0.071	-0.040	.0305	-0.018
1.700	0.46	-0.291	-0.054	.0239	-0.046
1.700	-0.52	-0.157	-0.055	.0238	-0.033
1.700	0.47	-0.245	-0.052	.0240	-0.045
1.700	1.49	-0.245	-0.052	.0241	-0.061
1.700	2.48	-0.302	-0.044	.0247	-0.071
1.700	4.50	-0.266	-0.041	.0248	-0.092
1.700	6.47	-0.240	-0.031	.0255	-0.110
1.700	8.47	-0.150	-0.037	.0251	-0.121
1.700	10.48	-0.087	-0.033	.0254	-0.109
1.700	12.47	-0.035	-0.038	.0250	-0.104
1.700	14.48	-0.088	-0.040	.0249	-0.090
1.700	16.51	-0.236	-0.040	.0249	-0.096
1.700	0.49	-0.168	-0.055	.0238	-0.044
2.160	1.45	-0.224	-0.045	.0214	-0.046
2.160	0.43	-0.226	-0.048	.0212	-0.039
2.160	-0.57	-0.140	-0.050	.0211	-0.030
2.160	-2.56	-0.102	-0.055	.0208	-0.010
2.160	-3.55	-0.167	-0.057	.0205	-0.002
2.160	1.43	-0.235	-0.044	.0214	-0.047
2.160	2.44	-0.304	-0.041	.0216	-0.053
2.160	3.41	-0.314	-0.039	.0218	-0.060
2.160	5.44	-0.434	-0.050	.0211	-0.063
2.160	7.42	-0.232	-0.039	.0218	-0.064
2.160	9.44	-0.209	-0.040	.0216	-0.068
2.160	11.43	-0.186	-0.045	.0214	-0.072
2.160	13.43	-0.286	-0.047	.0211	-0.075
2.160	15.47	-0.210	-0.044	.0214	-0.077
2.160	17.43	-0.114	-0.052	.0209	-0.075
2.160	1.42	-0.305	-0.043	.0215	-0.045
2.500	1.07	-0.122	-0.046	.0199	-0.026
2.500	0.10	-0.151	-0.056	.0193	-0.028
2.500	-0.94	-0.096	-0.063	.0188	-0.021
2.500	-2.91	-0.309	-0.067	.0186	-0.006
2.500	-3.93	-0.213	-0.073	.0181	-0.007
2.500	1.07	-0.029	-0.047	.0198	-0.033
2.500	2.07	-0.186	-0.042	.0201	-0.041
2.500	3.07	-0.310	-0.038	.0204	-0.035
2.500	5.09	-0.331	-0.049	.0197	-0.046
2.500	7.10	-0.274	-0.041	.0201	-0.050
2.500	9.11	-0.171	-0.035	.0206	-0.055
2.500	11.10	-0.312	-0.038	.0204	-0.057
2.500	13.10	-0.121	-0.039	.0203	-0.060
2.500	15.10	-0.210	-0.039	.0203	-0.064
2.500	17.11	-0.133	-0.040	.0203	-0.068
2.500	1.09	-0.148	-0.042	.0201	-0.035

TABLE XVI. - DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION A WITH ENGINE INLETS PLUGGED

Mach number, M	Angle of attack, α deg	Damping parameter, $C_{n_r} - C_{n_{\dot\beta}} \cos \alpha$ per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot r}}$ per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot r}}$ per radian
$\Lambda = 72.5°$; c.g. at $0.40\bar{c}$					
1.70	0.37	-0.056	0.115	.0332	-0.106
1.70	-0.54	-0.080	0.121	.0334	-0.095
1.70	0.47	-0.171	0.115	.0332	-0.099
1.70	1.46	0.024	0.110	.0330	-0.121
1.70	2.49	-0.089	0.109	.0329	-0.132
1.70	4.47	-0.157	0.103	.0326	-0.155
1.70	6.48	-0.193	0.099	.0324	-0.160
1.70	8.50	-0.119	0.105	.0327	-0.161
1.70	10.49	-0.133	0.088	.0318	-0.163
1.70	12.50	-0.094	0.079	.0313	-0.147
1.70	14.47	-0.065	0.100	.0325	-0.146
1.70	0.47	-0.112	0.115	.0332	-0.106
2.50	1.06	-0.207	0.056	.0245	-0.068
2.50	-3.90	0.240	0.066	.0249	-0.056
2.50	-2.93	0.048	0.064	.0248	-0.059
2.50	-0.91	0.167	0.060	.0246	-0.065
2.50	0.12	-0.113	0.059	.0246	-0.069
2.50	1.10	-0.135	0.053	.0243	-0.067
2.50	2.08	-0.103	0.050	.0242	-0.078
2.50	3.07	0.005	0.049	.0242	-0.082
2.50	5.07	-0.137	0.042	.0238	-0.080
2.50	7.10	-0.039	0.039	.0237	-0.078
2.50	9.09	-0.039	0.042	.0238	-0.087
2.50	11.11	-0.051	0.037	.0236	-0.086
2.50	13.09	-0.110	0.028	.0231	-0.086
2.50	15.10	0.058	0.040	.0237	-0.097
2.50	17.10	0.002	0.028	.0232	-0.093
2.50	1.10	-0.142	0.057	.0245	-0.071

TABLE XVII.- DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION B

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$, per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$, per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$, per radian
$\Lambda = 20^\circ$; c.g. at $0.30\bar{c}$					
0.60	-0.01	-0.183	0.094	.0889	-0.062
0.60	-1.99	-0.191	0.095	.0892	-0.048
0.60	-1.00	-0.209	0.095	.0892	-0.055
0.60	0.99	-0.197	0.096	.0892	-0.065
0.60	1.99	-0.198	0.093	.0887	-0.073
0.60	4.01	-0.198	0.093	.0889	-0.089
0.60	6.00	-0.187	0.096	.0893	-0.107
0.60	8.01	-0.208	0.114	.0921	-0.094
0.60	10.00	-0.206	0.114	.0921	-0.092
0.60	12.00	-0.202	0.096	.0893	-0.105
0.60	14.00	-0.197	0.095	.0892	-0.081
0.60	16.00	-0.206	0.063	.0841	-0.090
$\Lambda = 72.5^\circ$; c.g. at $0.40\bar{c}$					
0.80	-0.01	-0.184	0.091	.0768	-0.040
0.80	-2.01	-0.177	0.102	.0787	-0.024
0.80	-0.99	-0.165	0.097	.0780	-0.032
0.80	0.	-0.162	0.091	.0769	-0.039
0.80	2.01	-0.188	0.084	.0757	-0.057
0.80	3.99	-0.179	0.076	.0743	-0.068
0.80	6.00	-0.178	0.085	.0759	-0.089
0.80	7.99	-0.180	0.085	.0759	-0.096
0.80	10.01	-0.193	0.097	.0779	-0.125
0.80	12.00	-0.206	0.106	.0796	-0.146
1.20	0.09	-0.212	0.146	.0649	-0.051
1.20	-2.00	-0.275	0.183	.0695	-0.034
1.20	-1.01	-0.238	0.155	.0661	-0.041
1.20	0.	-0.213	0.144	.0647	-0.050
1.20	1.99	-0.194	0.123	.0620	-0.068
1.20	3.99	-0.202	0.105	.0596	-0.088
1.20	6.01	-0.197	0.106	.0596	-0.106
1.20	7.98	-0.198	0.092	.0577	-0.109
1.20	10.00	-0.206	0.123	.0621	-0.117
1.20	12.01	-0.287	0.180	.0692	-0.119

TABLE XVIII.- DYNAMIC STABILITY CHARACTERISTICS IN YAW OF BASIC CONFIGURATION B WITH VERTICAL TAIL AND VENTRAL FINS REMOVED

Mach number, M	Angle of attack, α, deg	Damping parameter, $C_{n_r} - C_{n_{\dot{\beta}}} \cos \alpha$, per radian	Oscillatory-stability parameter, $C_{n_\beta} \cos \alpha + k^2 C_{n_{\dot{r}}}$, per radian	Reduced-frequency parameter, k	Effective-dihedral parameter, $C_{l_\beta} \cos \alpha + k^2 C_{l_{\dot{r}}}$, per radian
$\Lambda = 72.5^\circ$; c.g. at $0.40\bar{c}$					
2.16	1.50	-0.123	-0.034	.0248	-0.037
2.16	0.42	-0.162	-0.038	.0244	-0.033
2.16	-0.55	-0.062	-0.039	.0244	-0.030
2.16	-2.57	-0.109	-0.043	.0240	-0.015
2.16	-3.56	-0.222	-0.047	.0237	-0.008
2.16	1.43	-0.078	-0.035	.0247	-0.036
2.16	2.44	-0.177	-0.037	.0245	-0.041
2.16	3.43	-0.198	-0.039	.0243	-0.045
2.16	5.45	-0.133	-0.035	.0247	-0.049
2.16	7.45	-0.096	-0.031	.0250	-0.057
2.16	9.44	-0.098	-0.038	.0244	-0.065
2.16	11.43	-0.117	-0.038	.0244	-0.065
2.16	13.43	-0.006	-0.035	.0247	-0.068
2.16	15.45	-0.014	-0.027	.0254	-0.072
2.16	17.41	-0.049	-0.024	.0256	-0.072
2.16	1.45	-0.076	-0.033	.0248	-0.035

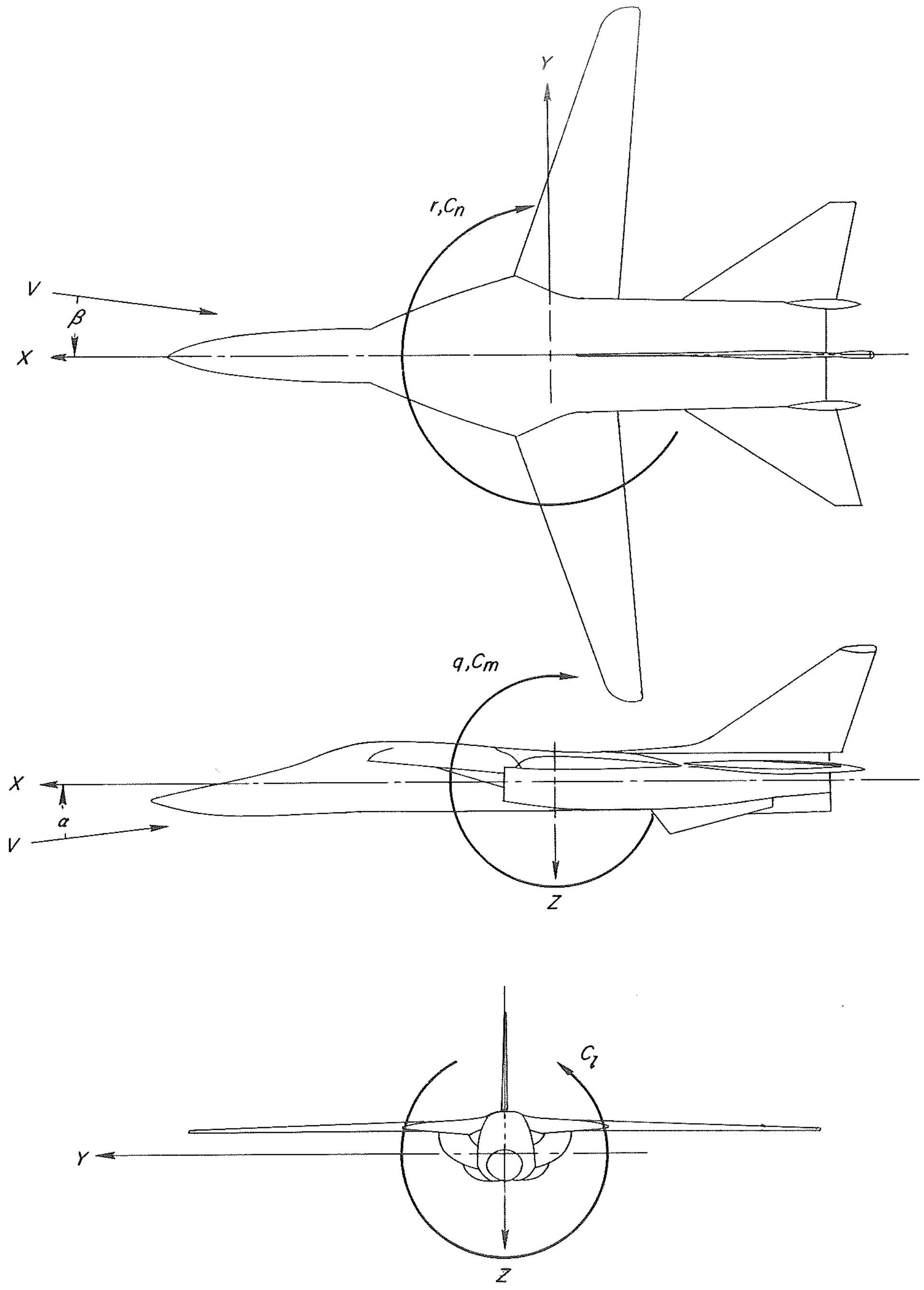


Figure 1.- Body system of axes with coefficients, angles, and angular velocities shown in positive sense.

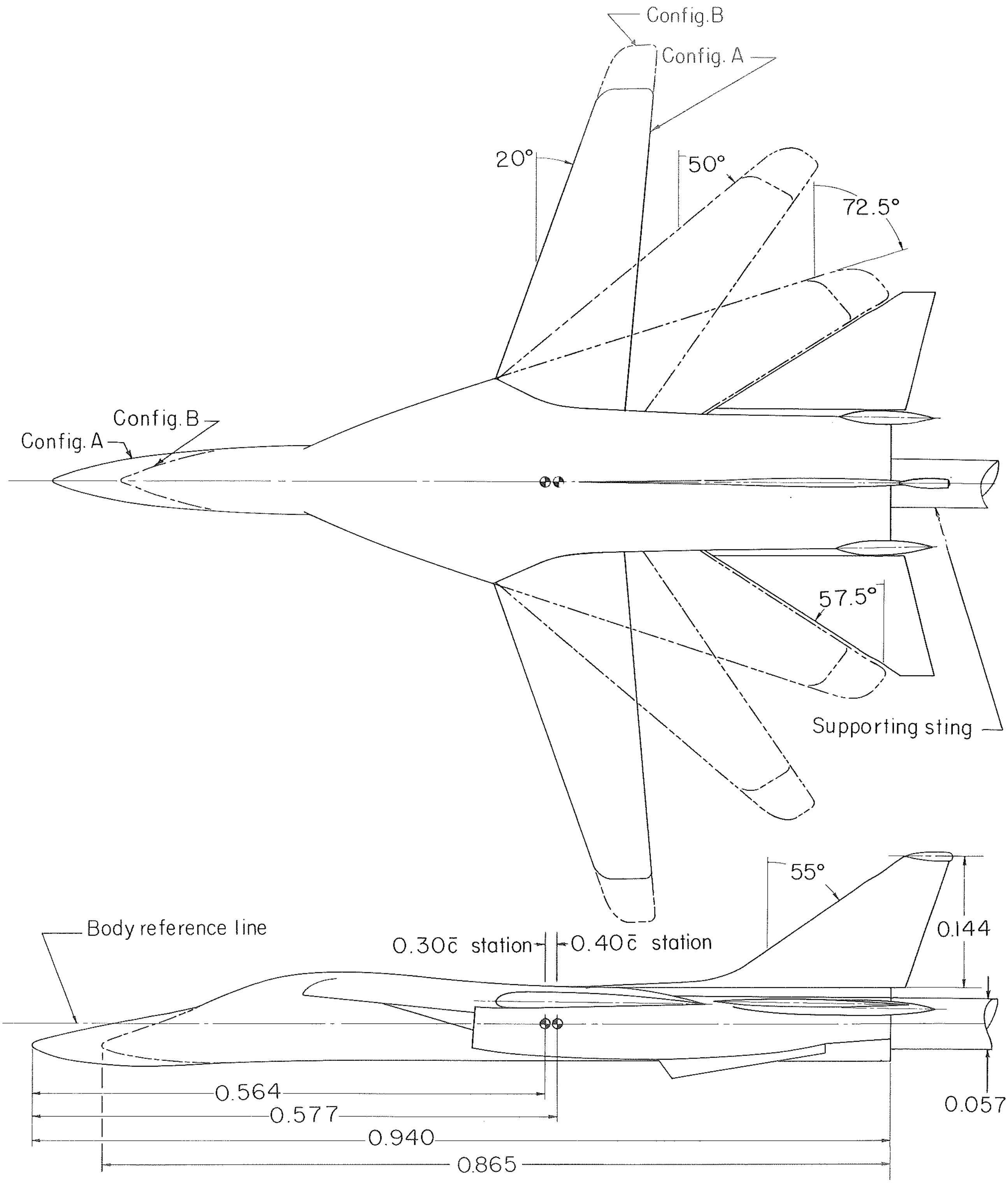
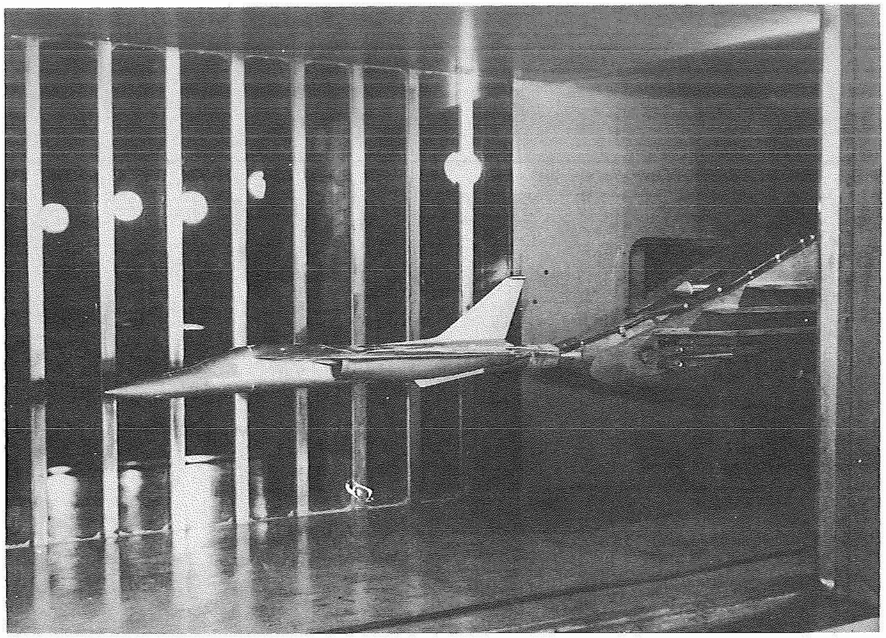
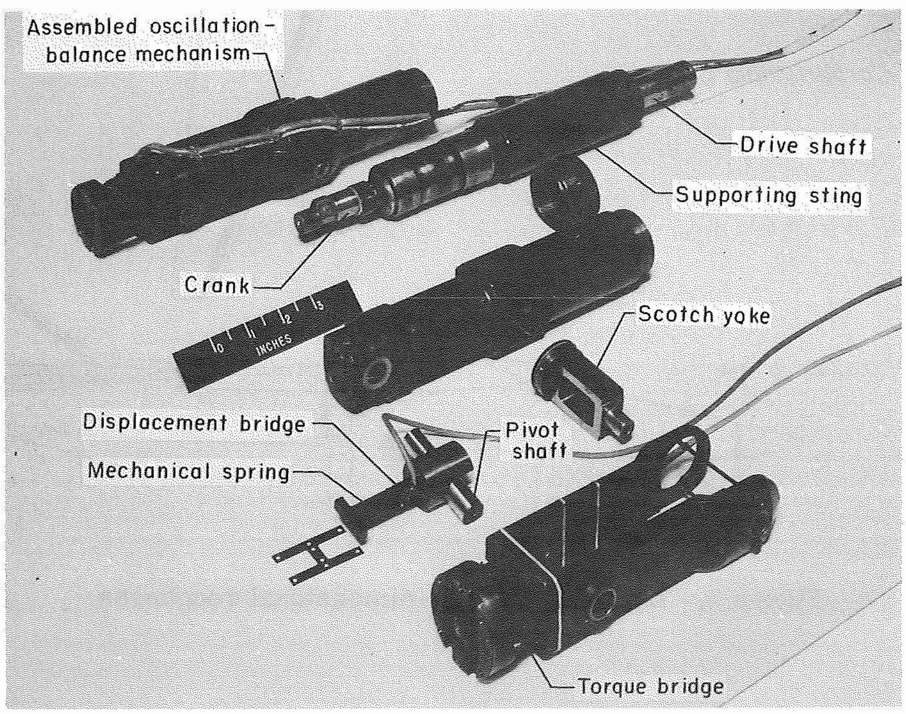


Figure 2. - Design dimensions of models. All linear dimensions in meters. (Moment center and oscillation axis are at $0.30\bar{c}$ for $\Lambda = 20^{\circ}$ and $0.40\bar{c}$ for $\Lambda = 50^{\circ}$ and 72.5° unless otherwise noted.)



L-63-9974

Figure 3.- Photograph of configuration A in test section of Langley Unitary Plan wind tunnel.



L-63-1969.2

Figure 4.- Photograph of forward part of oscillation-balance mechanism.

Measurement	Linear dimension, m	
	$0.40 \leq M \leq 1.20$	$1.70 \leq M \leq 2.50$
a	0.0025	0.0015
b	.0444	.0127
$c_{\Lambda} = 20°$	.0097	
$c_{\Lambda} = 50°$	.0079	.0081
$c_{\Lambda} = 72.5°$	.0069	.0038
d	.0053	.0069
e	.0058	.0074
f	.0102	.0127

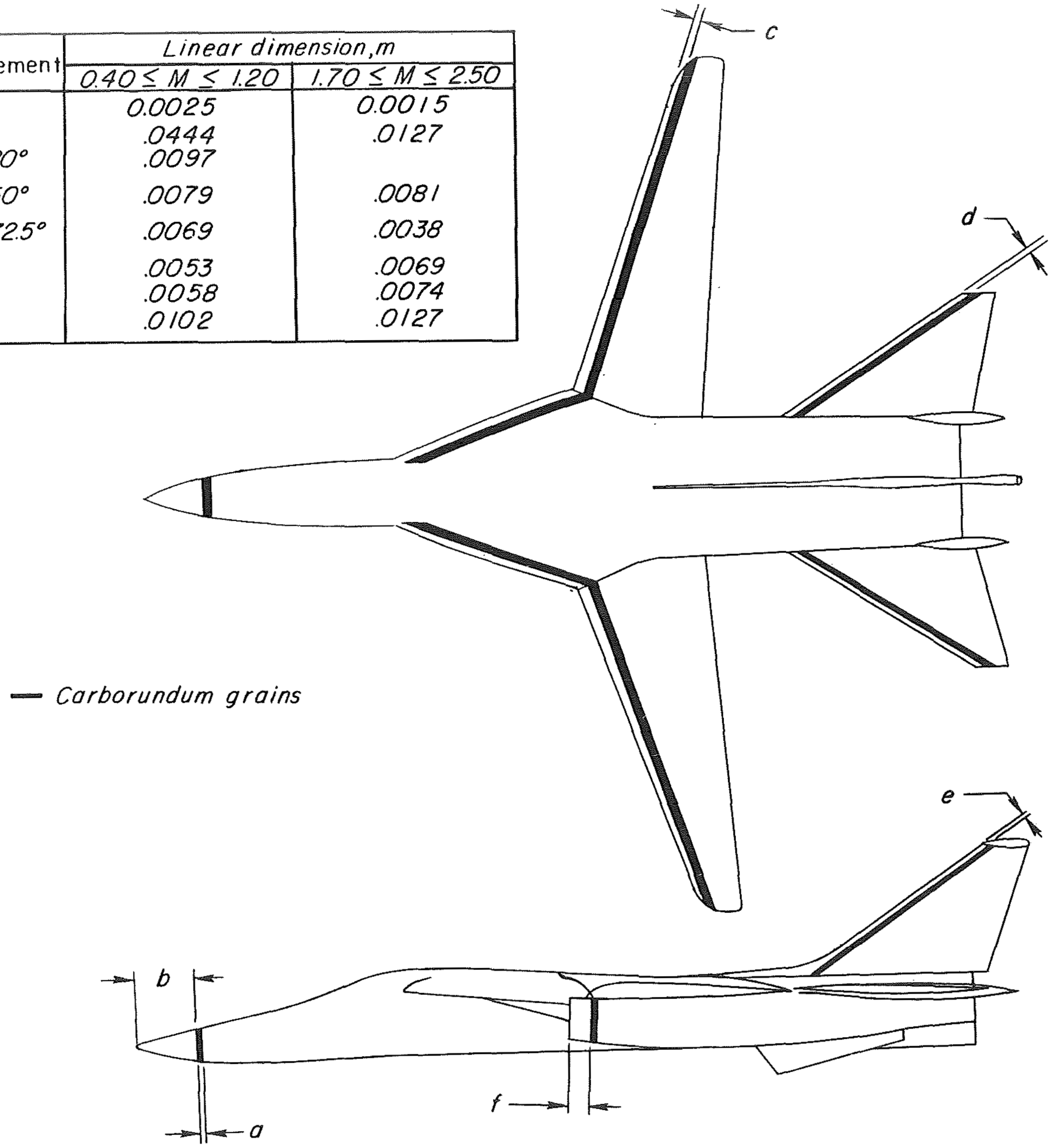


Figure 5. - Location of three-dimensional roughness.

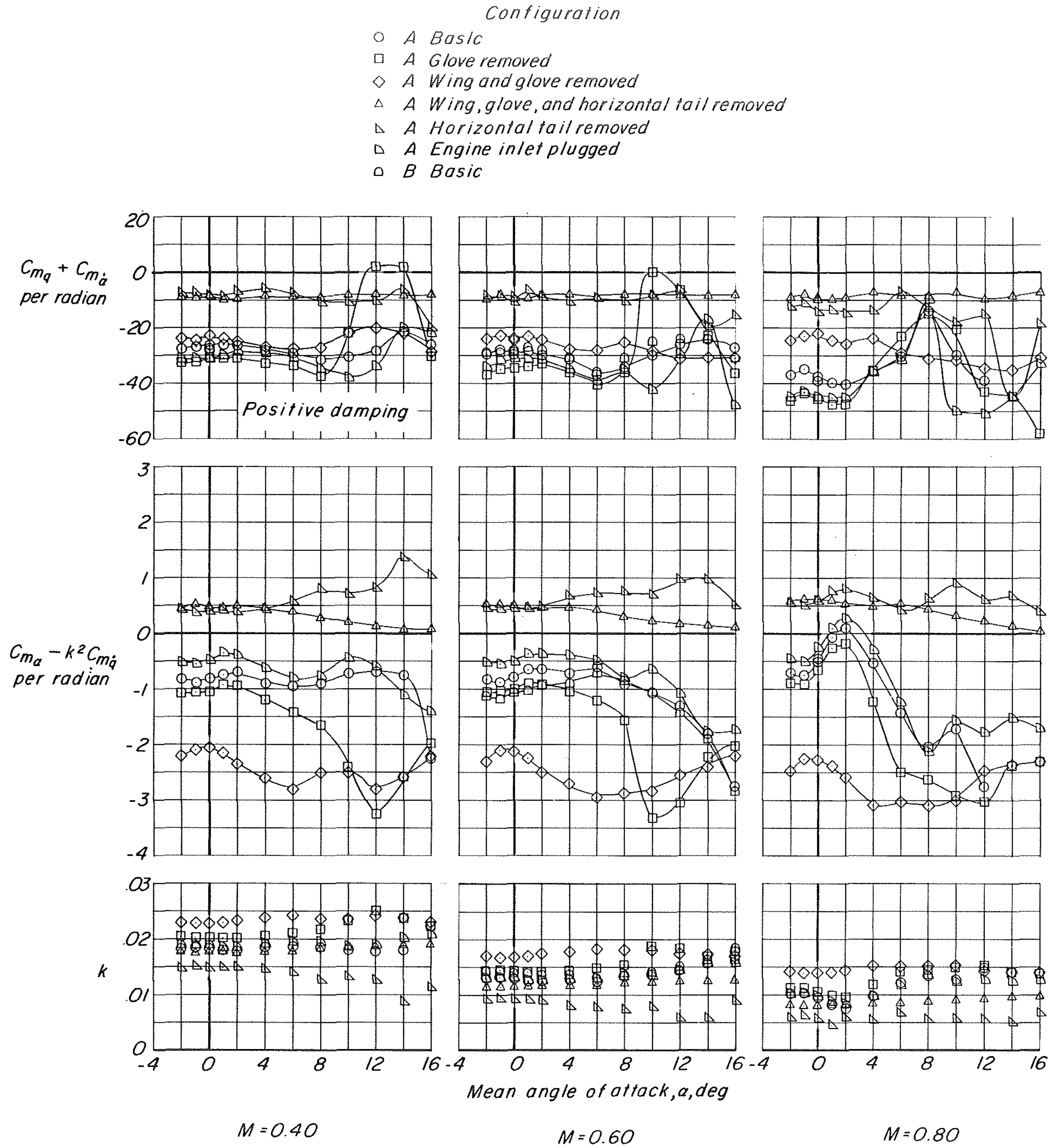
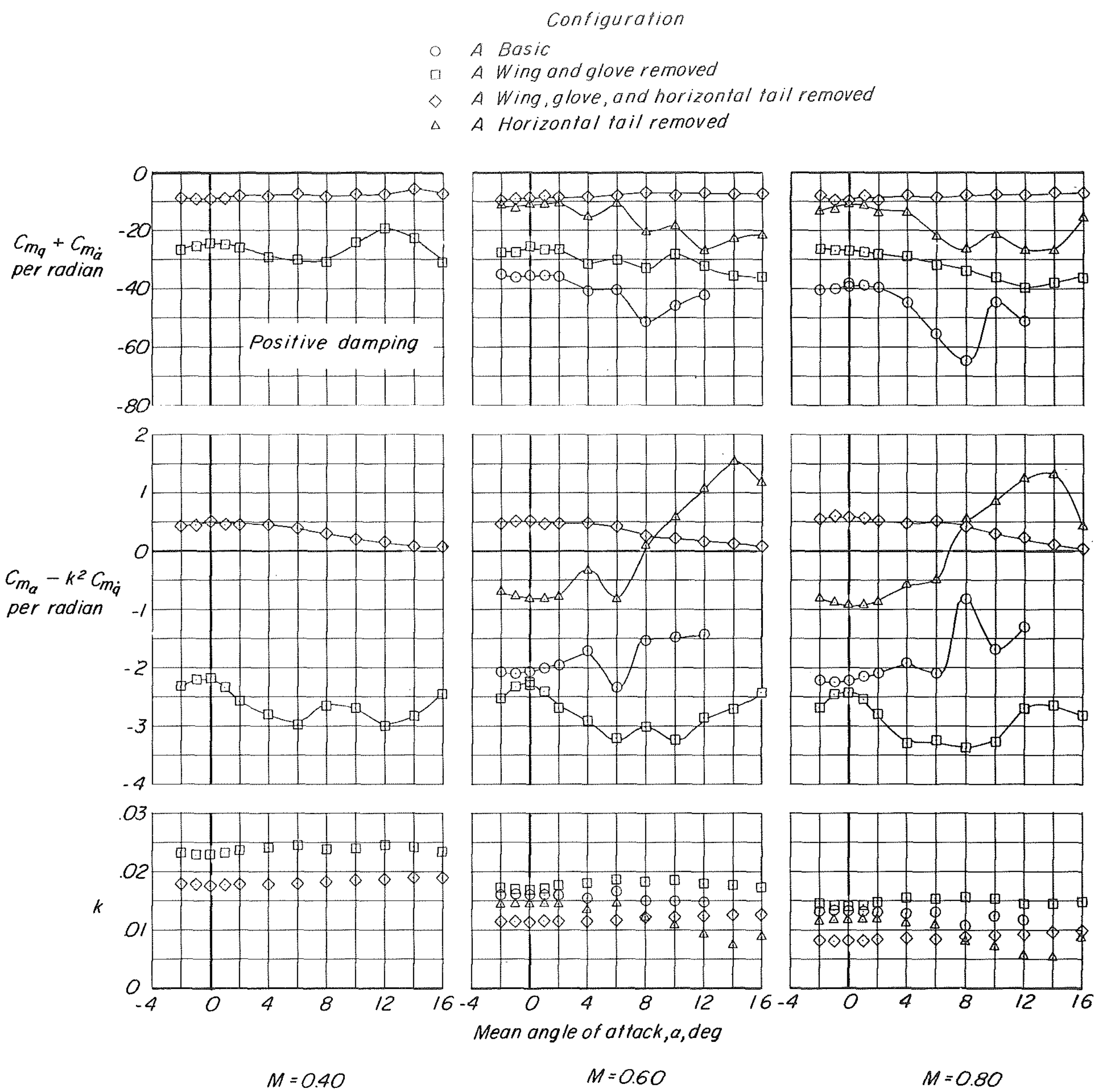
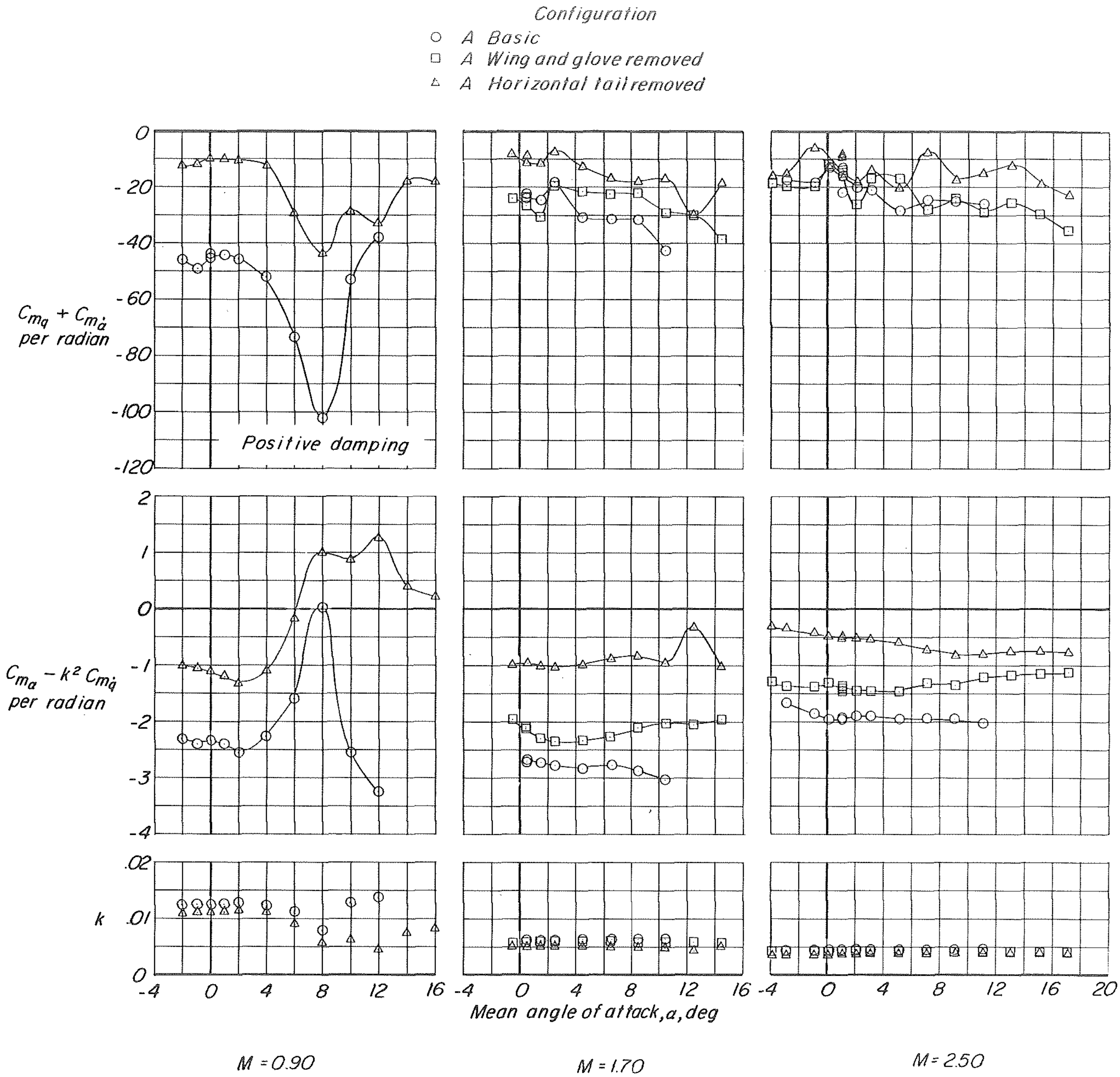


Figure 6.- Oscillatory longitudinal stability characteristics of a variable-sweep configuration with wing sweep of 20°, oscillation axis at 0.30$\bar{c}$, and horizontal-tail incidence angle of 0°.



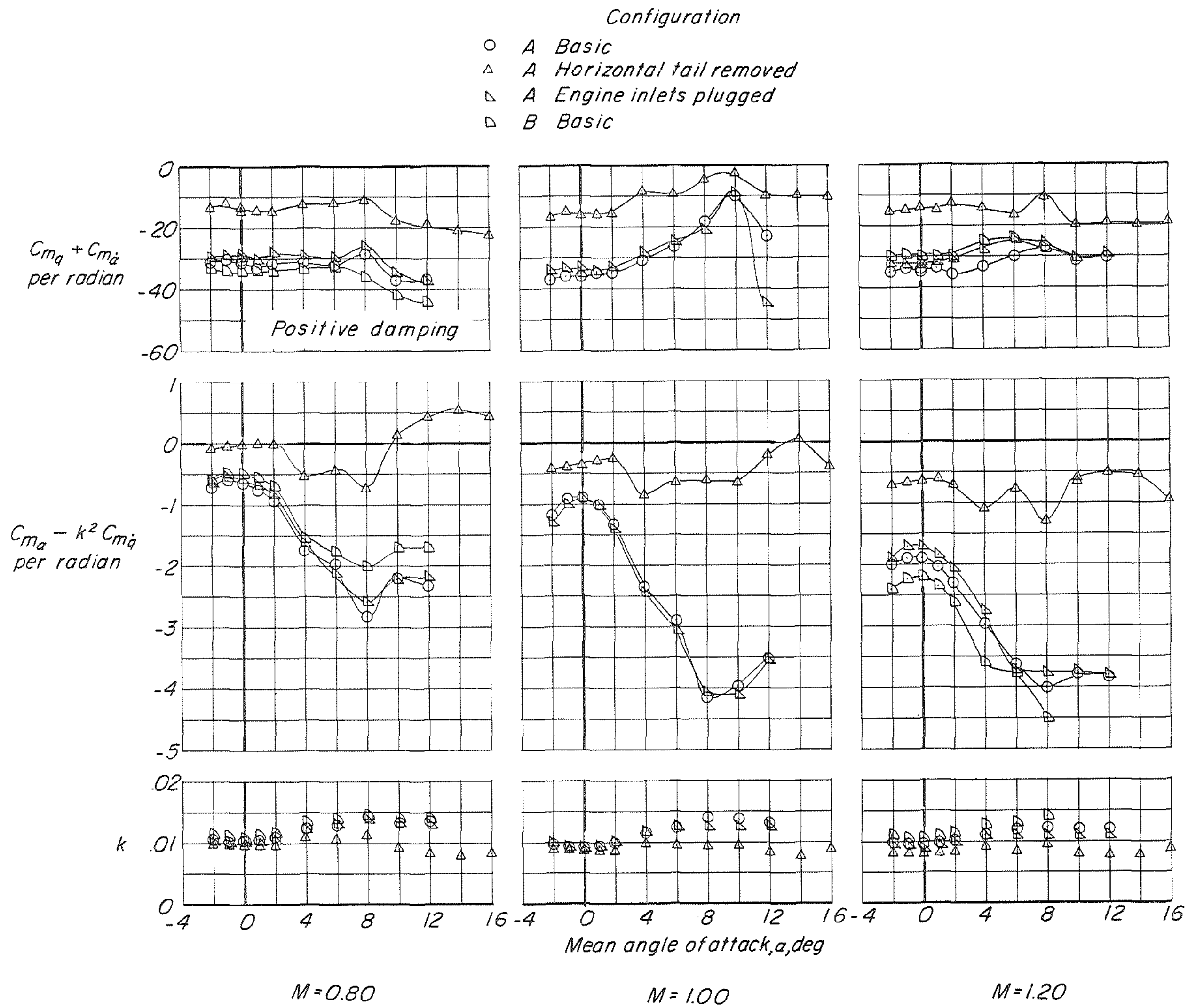
(a) Mach numbers of 0.40, 0.60, and 0.80.

Figure 7.- Oscillatory longitudinal stability characteristics of a variable-sweep configuration with wing sweep of 50°, oscillation axis at 0.40$\bar{c}$, and horizontal-tail incidence angle of 0°.



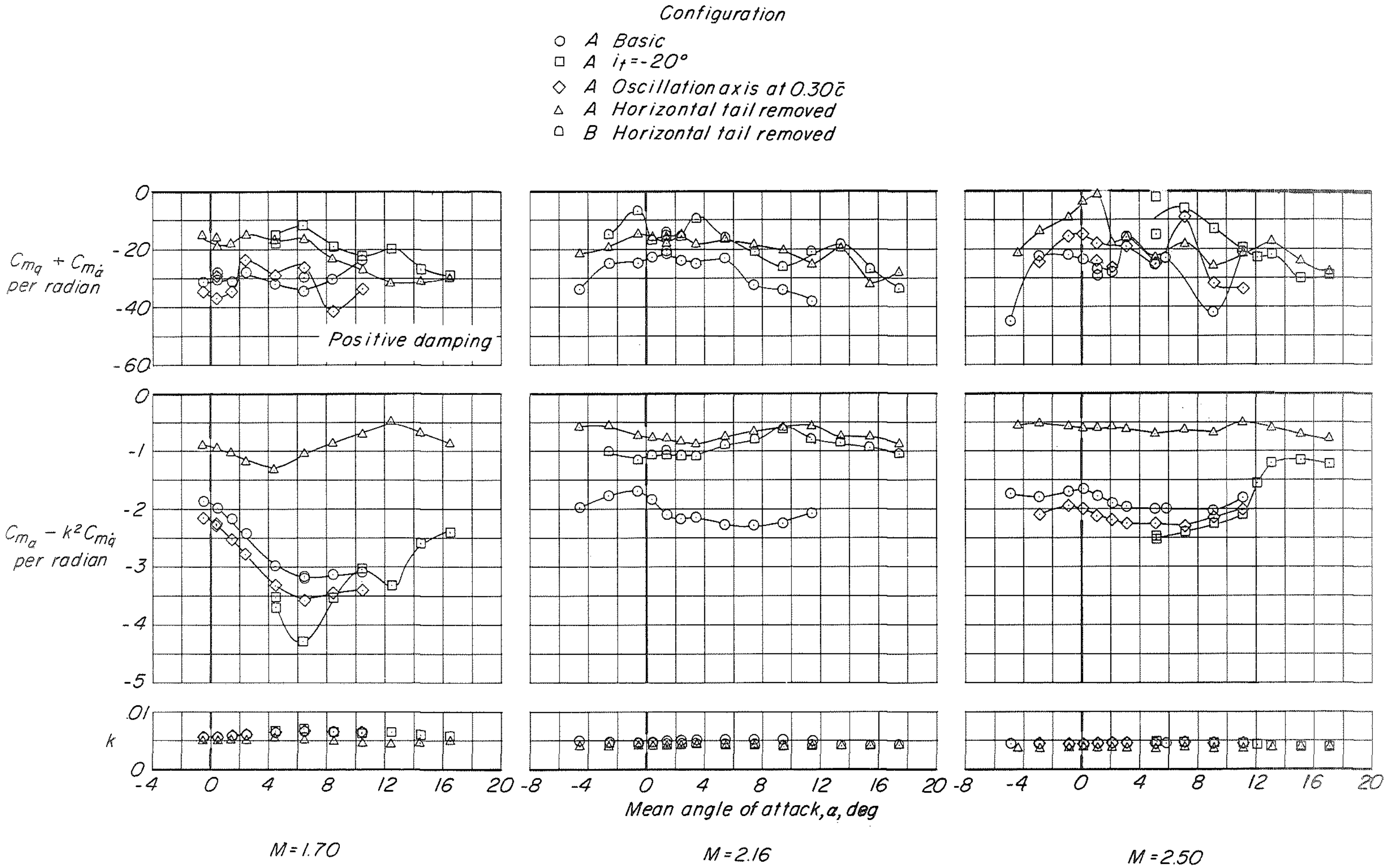
(b) Mach numbers of 0.90, 1.70, and 2.50.

Figure 7.- Concluded.



(a) Mach numbers of 0.80, 1.00, and 1.20.

Figure 8.- Oscillatory longitudinal stability characteristics of a variable-sweep configuration with wing sweep of 72.5°, oscillation axis at $0.40\bar{c}$ except as noted, and horizontal-tail incidence angle i_t of 0° except as noted.



(b) Mach numbers of 1.70, 2.16, and 2.50.

Figure 8.- Concluded.

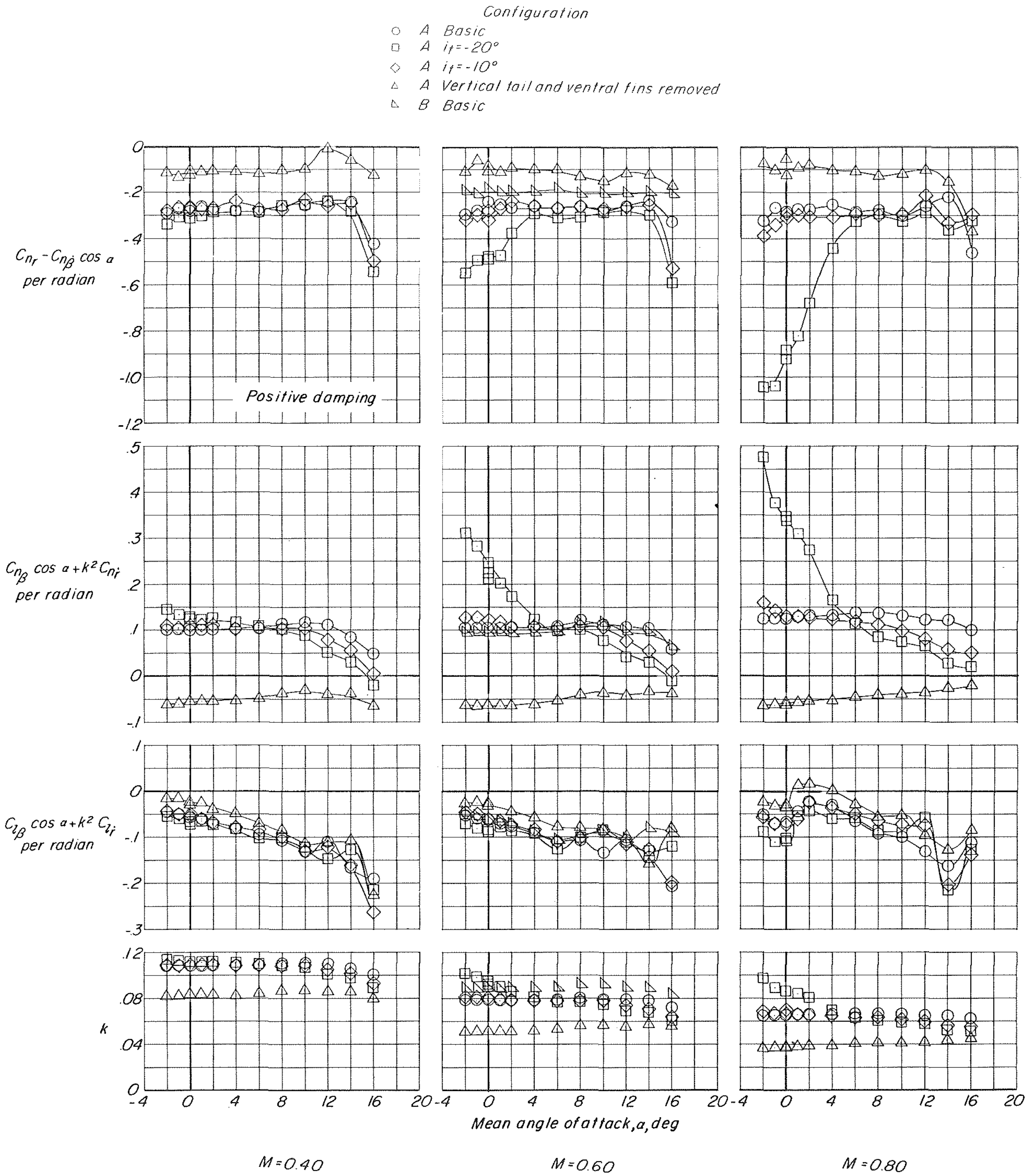
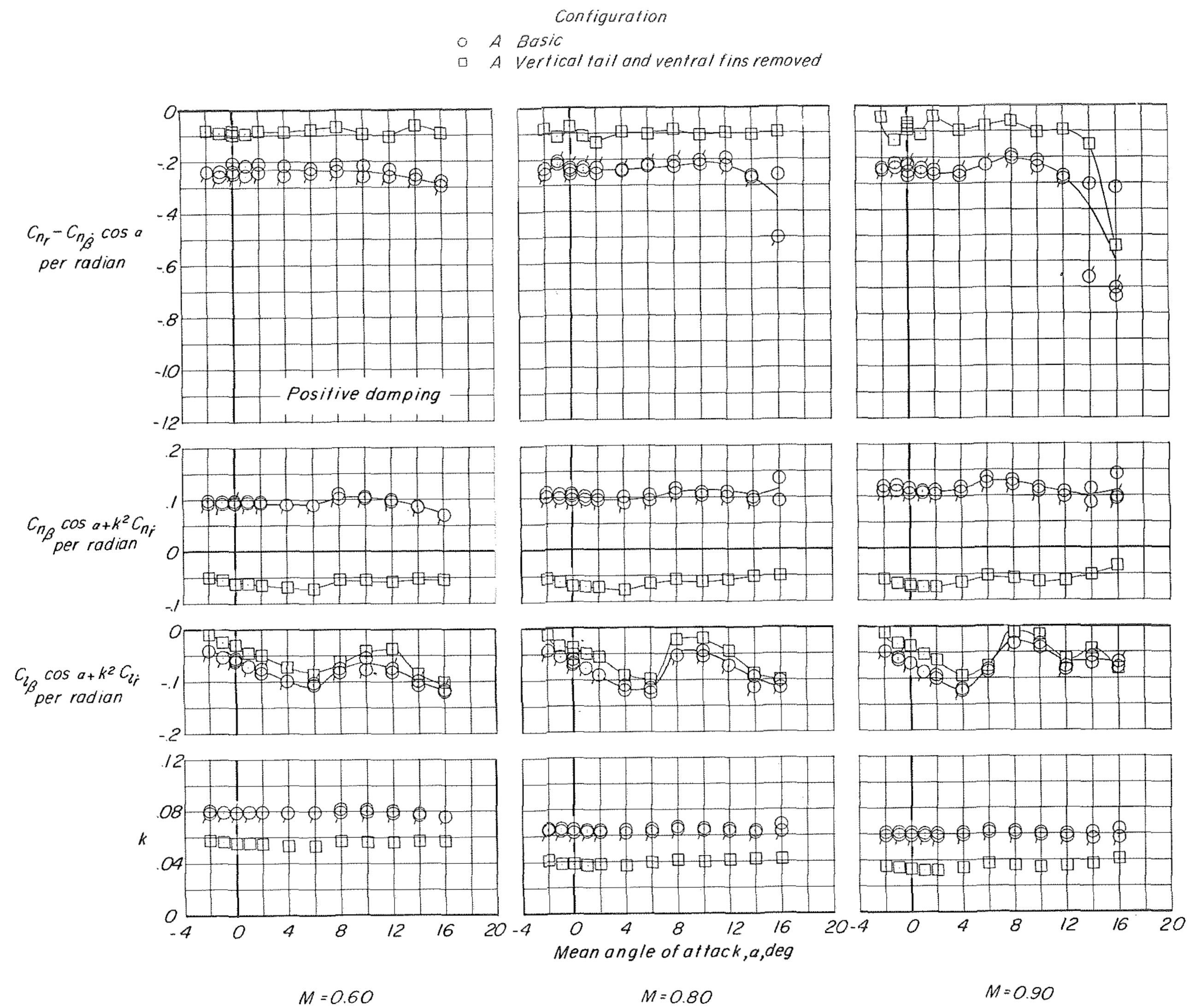
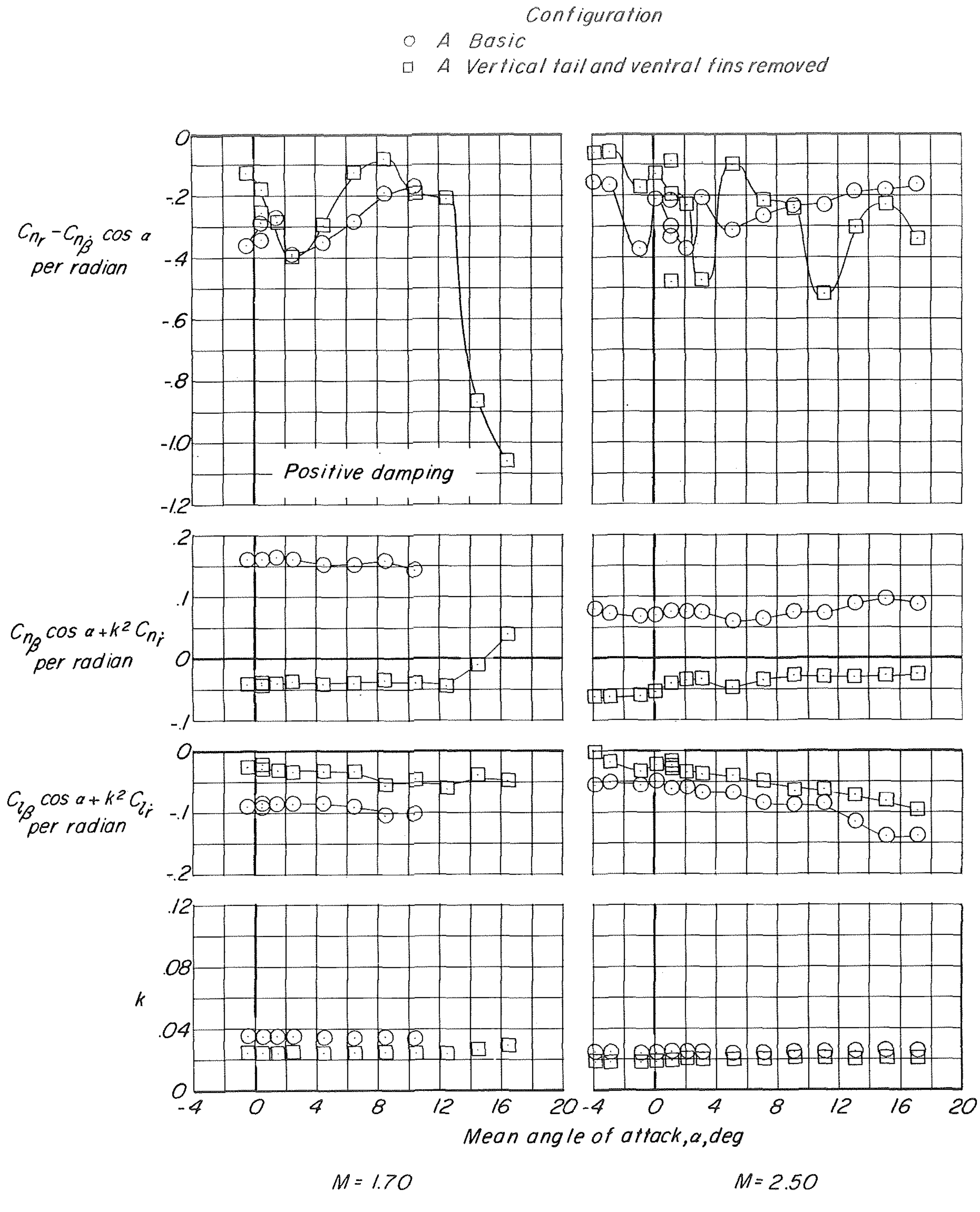


Figure 9.- Oscillatory lateral stability characteristics of a variable-sweep configuration with wing sweep of 20°, oscillation axis at 0.30$\bar{c}$, and horizontal-tail incidence angle i_t of 0° except where noted.



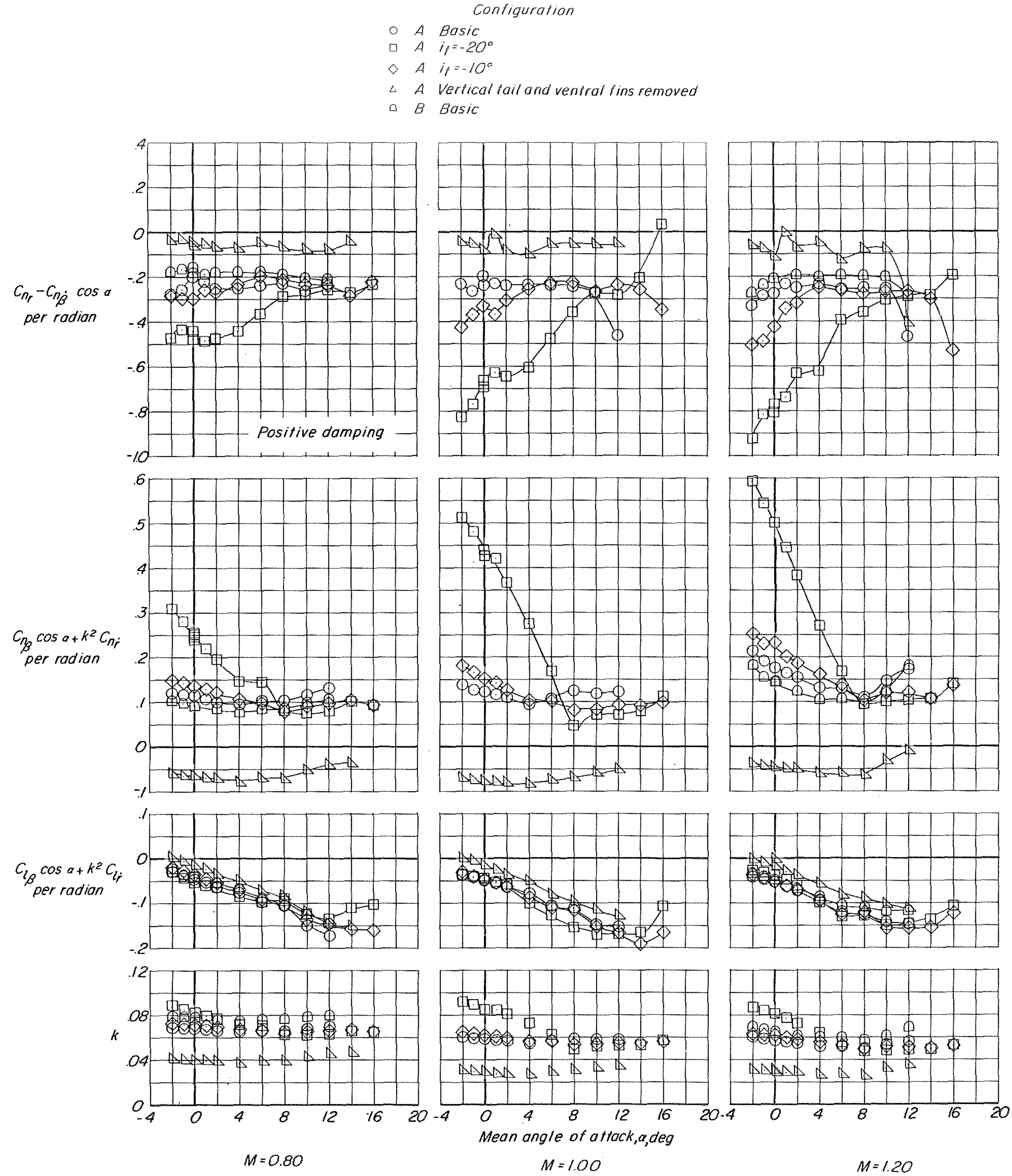
(a) Mach numbers of 0.60, 0.80, and 0.90. Flagged symbols used for repeat run.

Figure 10.- Oscillatory lateral stability characteristics of a variable-sweep configuration with wing sweep of 50°, oscillation axis at 0.40$\bar{c}$, and horizontal-tail incidence angle of 0°.



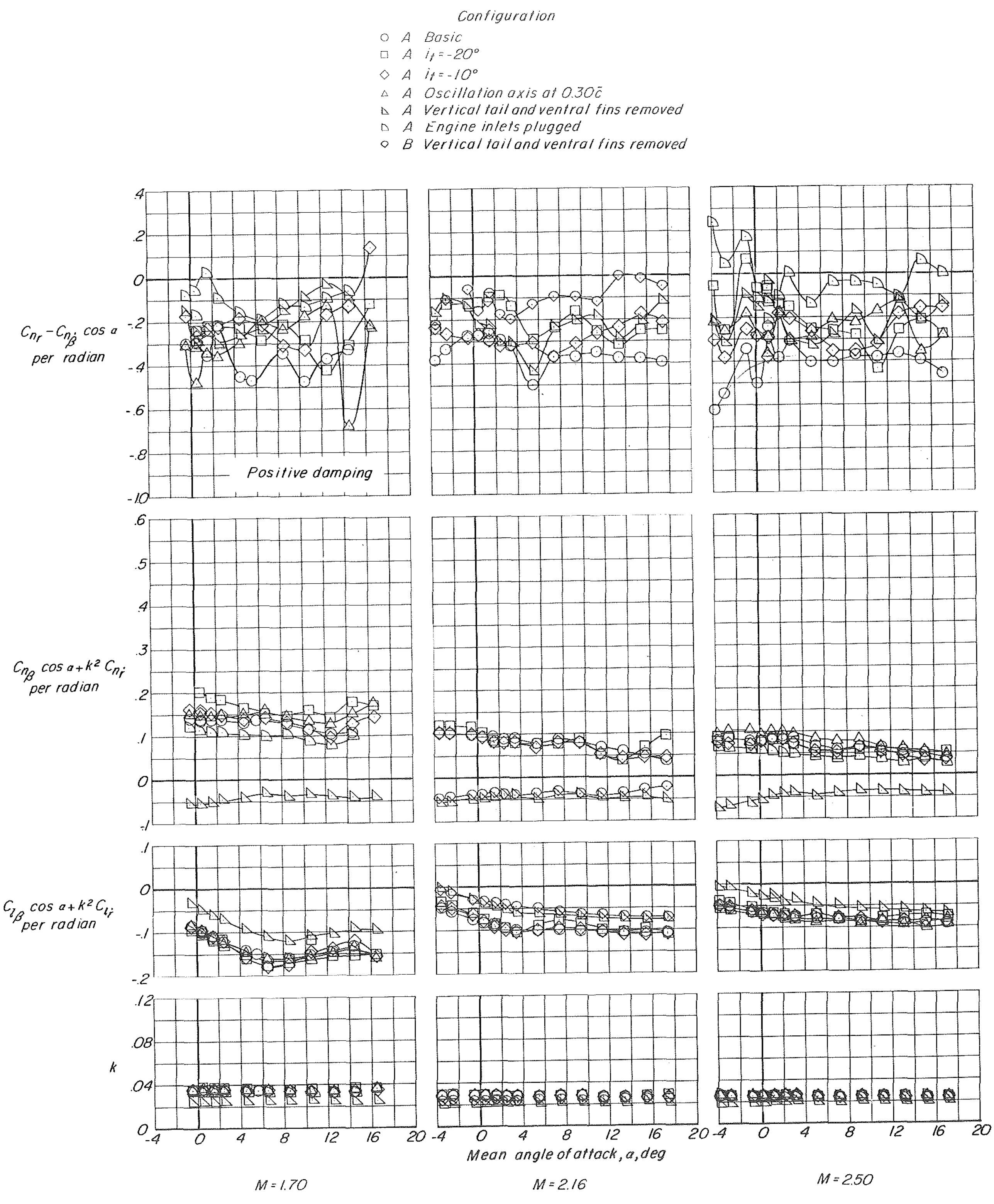
(b) Mach numbers of 1.70 and 2.50.

Figure 10.- Concluded.



(a) Mach numbers of 0.80, 1.00, and 1.20.

Figure 11.- Oscillatory lateral stability characteristics of a variable-sweep configuration with wing sweep of 72.5°, oscillation axis at 0.40$\bar{c}$, unless otherwise noted, and horizontal-tail incidence angle i_t of 0° unless otherwise noted.



(b) Mach numbers of 1.70, 2.16, and 2.50.

Figure 11.- Concluded.

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— NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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